The Power of Letters:
Inducing Understanding of the Alphabetic Principle in Pre-Literate Children.

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Abstract.

This thesis attempts to draw together two distinct perspectives on literacy acquisition, an educational perspective and a psychological perspective. Written English has a complex orthography that has motivated academics since the 15th century to devise 'definitive' teaching methods. Throughout much of the 20th century two influential and mutually exclusive teaching approaches dominated literacy acquisition, i.e. 'whole language' and 'phonics'.

Recently, empirical psychological investigation has opened a new debate into the cognitive underpinning required for successful literacy acquisition. A developmental psychological approach argues that literacy development should capitalise on children's naturally developing phonological awareness that generally progresses from large units of sound such as rhyme and syllables to small units of sound, such as phonemes. Conversely, an instructional psychological approach proposes that, irrespective of children's naturally developing ability, it is the phoneme and its correspondence with its visual counterpart, the grapheme, that needs to be brought to children's attention from the earliest stages of learning about written language.

It will be argued from an educational perspective, that the whole language approach is sub-optimal for induction into an alphabetic script and most phonics approaches take too long to be effective, are too decontextualised, or require too much apparatus.

In line with the small unit approach in psychology, it is proposed that the starting point for literacy acquisition is to focus pre-literate children's attention on the 44 English grapheme-phoneme correspondences that can be blended and segmented into phonetically pronounceable words. This proposal was investigated in an intervention study over a period of 8 weeks for 10 minutes a day, in a whole early-years class setting and an error free entertaining environment.

Results showed that this significantly improved initial literacy acquisition for less advantaged children, suggesting that an early induction into the alphabetic principle provides children with "a framework for setting up a written language recognition and production system sufficient to drive the development of a self-teaching mechanism" (Share, 1995; Stuart, 2000).

The practical implications of this finding have particular significance for the NLS, which proposes a later start and a two-year structured programme of phonics teaching.

For my granddaughter
Katherine Alexandra Poole

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Introduction and Overview of the Literature.

This thesis attempts to draw together two distinct perspectives on literacy acquisition, an educational perspective and a psychological perspective. The author's own difficulties with written language motivated the research into the diverse and sometimes mutually exclusive teaching methods and their relationship to the psychological factors that underpin the ability to learn to read and write. It is hoped also to address the need for 'real' classroom research into the role of phonological awareness in literacy acquisition.

The Educational Perspective.

The central question is addressed to the educational perspective. Why has the 'battle of the teaching methods' not been resolved to ensure that all normally developing children are able to read, write and spell to a competent level? Two questions for psychology emerged from this central question; a) what psychological mechanisms did empirical research reveal to be crucial to literacy skill? b) Could psychological research help to reconcile the polarised and often entrenched views of pedagogic theorists? The quest for the source of the divergent pedagogical theories led inexorably to the point at which the Latin alphabet lost its one to one letter/sound correspondence when mapped onto an evolving English language and the names and sounds of the letters became confused. Towards the end of the 14th century, when written English finally became the mainstream written language in England, there was a growing sense of frustration with teaching the alphabetic method inherited from the Roman Catholic Church for teaching Latin. Novel approaches to literacy abounded throughout the 15th

and 16th centuries in England and Germany and scholars and academics rejected the ABC approach for diverse reasons. Humanist scholars throughout Europe began to question the alphabetic rule driven instruction and favoured instead a total immersion in classical texts as a starting point for literacy acquisition. Pupils in this approach were only required to focus on individual letters once they understood the major texts 'at every level', and had learnt them by heart. A less rigorous version of this top-down approach was enthusiastically adopted for written English at various points in history and, in the 20th century, lead to a mainstream shift in emphasis to *literary* skill as opposed to *literacy* skill. In this view, the child was expected to leapfrog the complexities of the basic elements of literacy by enjoying, at a higher level, the literary works purported to be the purpose of acquiring the literacy skill.

Other academics in the 16th century tried to highlight the importance of the 'phonic power' of the letters which was the original inspiration behind the alphabet, making it one of the major innovations of the Western World. For this approach, students would link the sounds in a spoken language with their written counterparts, running them together to form words. Finally, a fourth approach was to suggest that as 'letters were monsters for young children' they should start by simply learning to match whole spoken words with the pattern of the corresponding whole written word. However, all three alternative approaches, immersion in literature, the phonic power approach and the whole word approach came and went in cycles but the alphabetic method (not to be confused with the 'alphabetic principle') endured throughout to the 19th century and beyond. This involved the rote learning of letter *names* but not the sound value (i.e. the phonic power) of each letter. Only when the letters could be named and printed would pupils move on to pronouncing, printing and learning by heart, all the consonant/vowel digraph combinations (e.g. ba, be, ab, eb, etc) before proceeding to the written practice of short texts and thence to decoding written language. If the pupils survived the tedious months, even years, of rote learning the decontextualised symbol names and digraph combinations, they were then faced with the irregular and idiosyncratic spelling of words that had been absorbed into English but still retained the 'etymological' spellings in deference to the language from whence they came.

The Psychological Perspective.

Paradoxically, the psychological perspective was finding empirical evidence from numerous psychological studies that showed that in spite of the seeming lack of letter/sound correspondence in English, it was the awareness of the sounds within spoken language that distinguished between good and poor readers and spellers. Children who were aware of rhyme or alliteration seemed more able to grasp the alphabetic principle than did their phonologically unaware peers. Was this because they had the advantage of being introduced, even incidentally, to the alphabetic principle from a very early age or did a naturally developing phonological awareness enable them to acquire the alphabetic principle? Numerous studies demonstrated that intelligence was not a major factor but socially underprivileged children were found to be less likely to have 'phonological awareness' and, therefore less able to grasp the alphabetic principle than children from a more supportive and privileged socio-economic group.

Further, within the psychology perspective, there were differences to be reconciled between those with a developmental approach and those with an instructional approach. The developmental approach proposes that, initially literacy development should capitalise on children's naturally developing phonological awareness that generally progresses from large units of sound such as rhyme and syllables to small units of sound, such as phonemes (the smallest speech sound that distinguishes between meanings e.g. /a/, /th/, /igh/, /ough/). Conversely, those with an instructional approach propose that, irrespective of children's naturally developing ability, it is the phoneme and its correspondence with its written counterpart the grapheme (e.g.1-4 letters that represent a phoneme, see above) that needs to be brought to children's attention from the earliest stages of learning about written language. The goal of both these theoretical positions is, however, the same, i.e. to induce the ability to segment and blend phoneme-grapheme correspondences* in order to read and spell, in short, the alphabetic principle as devised in the first place by the ancient Greeks.

The empirical evidence supporting these two perspectives on initial written language acquisition within psychology will be examined in the second half of the review of the relevant literature and will be related to the conclusions drawn from the educational perspective in the first half.

The Purpose of this Study.

The issue to be addressed therefore, is how, in a complex orthography like English, to reconcile the difficulties of inducing the phonic power of letters i.e. the alphabetic principle, which psychology would propose is essential to literacy acquisition, without crushing the enthusiasm for literature which the ubiquitous Humanist approach in education would expect to be the outcome of such an enterprise.

**As there is no commonly acknowledged abbreviation for the term 'phoneme-grapheme correspondence' the accepted term 'grapheme-phoneme correspondence' and the abbreviation 'gpc' will be used throughout this thesis.*

Chapter 1.

The Source of Current Teaching Methods:

An Historical Review.

Writing in English.

When the Romans arrived in Britain, they brought with them a modified version of the Greek alphabet for administrative, academic and artistic pursuits in Latin. However, by the first century of the first millennium, it was the Christian Church that was the all-important agency in the encouragement and development of mass literacy in Britain. In order to evangelise they needed to educate and the language of Christianity was Latin. It is highly likely that missionary priests from Ireland mapped the Latin alphabet onto English phonemes, probably for commercial purposes, sometime in the 7th Century (Davies, 1973, Manguel, 1996). This process was necessarily less systematic than when the Ancient Greeks originally accomplished the intellectual feat of identifying each and every phoneme in their language and devised a complete set of symbols to map onto the phonemes (Mathews, 1966). In England accents and dialects were numerous and the task was undertaken piece-meal with an alphabet that had insufficient letters to correspond with the number of English phonemes. However, only a few modifications and additions were required for it to become the permanent code for the written representation of English.

By the 9th Century, in the days of King Alfred (849-899), English might still have had a close relationship between its spelling and contemporary pronunciation (Davies, 1973) but slowly, both written and spoken language evolved. Diacritical marks, for example, that indicated long vowel sounds (e.g. changing 'ham' into 'home'), were abandoned and nouns that had been declined began to lose their case endings, leaving a single survivor,

'-e', which came to take the place of the accented 'a' as in 'ham' (home). It was only in 1385, seven centuries after the development of written English, that all grammar schools in England were directed to learn in English and it became the mainstream written language (see Davis 1973).

Around this time literary works in English were appearing more frequently, and the works of Geoffrey Chaucer dominated the second half of the 14th century. Throughout this period, as pronunciation changed so the written word followed but towards the end of the 15th century William Caxton and his printing press made works written in English available on a much larger scale. Unfortunately this set the spelling of English words before the written language had stabilised.

Many words borrowed from other languages were spelt as they had once sounded in English. And added confusion was caused in the 16th Century, when a policy was adopted by some high-minded scholars, of spelling these borrowed words in a way to indicate the source of such terms. In spite of vigorous protests against these 'etymological' spellings by more pragmatic academics such as John Hart in *A Method* (1570), who favoured adhering to the alphabetic principle of the ancient Greeks, they became established e.g. debt, subtle, island, psalm (Skeat, 1924; Baugh, 1935). By the Elizabethan period (1558-1603) the desired correspondence between symbol and sound had degenerated to such an extent that Hart dismissed it as "such confusion and disorder - as may be accounted rather a kind of ciphering or - a dark kind of writing."

English is spelt today more or less as it was spelt by the end of the Elizabethan reign in 1603 ending a period in which ideas for spelling reform may have had a chance to succeed but had, unfortunately, been crushed. Ideas for simplified spelling have resurfaced from time to time and in the present day, the ubiquitous use of text messaging by mobile phone and e-mail, is precipitating a subtle development in written language.

The Teaching of Written Language.

The ABC in The Middle Ages in England.

The first reference to the alphabet in English as ABC or 'abece' was in 1297. The most common arrangement for the ABC was in the form of a cross, with A at the top and Z at the bottom and came to be called Christ-cross and eventually Criss-cross. This was used as an introduction to the basic elements of written language, the letter names, and could be carved on wood, embroidered on cloth or written on parchment. Pupils were taught to 'name' each letter (e.g. 'cee' 'ai' 'tee' says 'cat' -which it patently does not!) instead of blending the sound value of each letter together to pronounce the word (e.g./c/, /a/, /t/) as an ancient Greek or a Roman pupil would have learnt to do. This problem arose because the Romans had failed to retain the names of the Greek alphabet when they adopted it. Instead they categorised some letters by the word *consonant*, which meant sounding with, and so duly attached a vowel to the sound of each letter to form a name e.g. the Greek 'beta' became /b/+/ee/=bee. The remaining letters they called by an antecedent of the word vowel that simply means sound. This was not a problem for the transparent Latin based written languages but failing to distinguish between the name and the sound of a letter caused endless difficulty for teachers of more opaque languages such as English (Davies 1973). At this time, the words on the page simply acted as an 'aide memoire' and scholars would usually learn the text by heart speaking it aloud (silent reading was often viewed with suspicion). This was demonstrated by the abbot who had failed his literacy test and had appealed on the grounds that he had been asked to read a text that was unfamiliar to him (McMahon and Murphy, 1987).

The Alphabetic Method.

In the 15th century the limitation of the criss-cross was realised and the Hornbook was devised, consisting of a thin oak board with a handle, bearing a sheet for script, protected by a thin layer of horn. All the language elements considered important for the beginning reader were included, such as the letters in capitals and lower case, syllabic combinations for blending syllables in various combinations (ba ca /ab, eb etc) and a Holy Text such as the Lord's Prayer for reading practice. It remained an enduring device for teaching the alphabetic method for 400 years, to the 19th century (Davies, 1973; Manguel, 1996; Mathews, 1966). A complete description of a horn book can been found in Appendix 1.

A Radical Top Down Approach.

However, Humanist scholars from Germany challenged the skills and drills approach in the middle of the 15th century in reaction to the strictures of the Catholic Church. Their influence brought about fundamental changes across Europe from The Netherlands down to Italy (Manguel, 1996). Jakob Wimpfeling writing in the 15th century lamented the lack of spontaneous composition among contemporary students and many schools and colleges began to reject the morass of grammatical rules learned by rote. Instead students were guided through classical texts, dissecting them systematically and rigorously, "milking them for every drop of sense". They copied series of words to be associated with the sound of memorised lines (Suzeau, 1991). Eventually, they were expected to come to understand not only the alphabetic principle but also all the grammatical rules, by a process of osmosis. Although, in reaction to the Reformation, schools throughout Europe fell back under the domination of the Church and the skills and drills of the ABC, the Humanist's top-down radical approach has ricocheted throughout history. It was woven into the Humanist philosophy that swept

Europe towards the end of the 18th century when Jean-Jacques Rousseau's 'Emile' (1762), promulgated the *wholeness* of 'Natures Way'. This 'Age of Enlightenment' inspired educationalists such as Gedike, (1754-1803) and Jacotot (1790-1840) to propose that the place to start learning to read was at the level of *whole text* (Mathews, 1966). It was to reappear and take root again as the '*whole language*' approach in 20th century England, this time en route from the USA, passionately proposed by Huey (1908), Goodman (1967) and Smith (1971) in America and enthusiastically promoted by Meek (1982) and Waterland (1985) in England.

The Alphabetic Principle: The Phonic Power of Letters.

Throughout the 16th century novel teaching methods proliferated in both England and Germany and it was from Germany that teachers were first alerted to the difference between the names and the sounds of letters. Valentin Ickelsamer (1501-1542) decided to devote his life to improving the manner in which children were taught to read (Vogel, 1894) and turned to the Latin grammarians such as Quintilian (c.35-95) whose manuscript 'The Institutes of the Orator' had just been rediscovered in a monastery archive. This inspired the theory that it was the 'phonic power' of letters that holds the key to literacy. Quintilian had disagreed with learning the alphabet, in order by rote and had instead proposed that children should be allowed to play with letter shapes made of ivory or wood, sounding out the letters and tracing round the shape of them with their finger. This theory was developed and put into practice by the eminent Maria Montessori (1870-1952) and is a theory that resonates with the approach to be developed in this thesis. Ickelsamer reasoned that written language must have been developed from analysis of the sounds in words. Therefore, as the sounds come first, it was wrong to focus on learning the names of alphabetic letters first in learning to read. The place to start, he reasoned, was to make children aware of all the sounds in their spoken language. He proposed this should be done by oral analysis, that is by identifying the place of articulation in the mouth, an idea rediscovered by the Lindamoods in the 1970-1980's which they used to help severely disabled readers. Once Ickelsamer's pupils could identify a sound wherever it came in a spoken word, they were taught the letters that represented the sounds. He was careful never to mention the *name* of the letter but instead showed the letter next to a picture of a word or a word that began with that sound in much the same manner as the ancient Greeks.

Unfortunately, Ickelsamer was largely ignored in his own time, possibly because his ideas were seen as too scientific and his approach in practice too laborious, but Ickelsamer himself hinted at darker motives, "..those who do know it ('sounding' letters correctly), so like to be the only learned ones, and esteemed and respected therefore, that they will not teach it properly to anybody, and keep it in their schools and heads" (Kern, 1937). This may have been true, contemporary scholars may have wished to defend their elite status. For indeed, in Greek times when reading and writing simply involved blending and segmenting letter-sounds, those who taught this mechanical skill were treated with disdain. A reply to a question about the fate of an Athenian who failed to return from far-flung expeditions, around 415 BC, was "He is either dead or teaching the ABC's", implying that he had been taken captive as a slave (Monroe, 1902). Although there were some enthusiastic proponents of Ickelsamer's ideas such as John Hart in England, in the main, schools in both Germany and England retained the alphabetic method with ever increasing skills and drills.

However, his legacy is enduring. Some 400 years later, Denis Stott's 'Programmed Reading Kit' (1964) was strongly reminiscent of his ideas as was a range of other phonic approaches in between. The importance of children's awareness of the sounds within their language was reiterated by Vygotsky (1896-1934) in the USSR in the first half of the 20^{th} century. Subsequently known as 'phonological awareness', it was introduced into mainstream psychology by Elkonin (1963), Zhurova (1963) and Mattingly (1972) and it remains an enduring source of psychological investigation to this day.

A Phonetic Alphabet for Written English?

There was a brief moment when Ickelsamer's influence could have changed the course of written English. Some 40 years after Ickelsamer published his primer in 1527, John Hart (1570) in England, exasperated with "the abomination" that written English had become, was inspired by the 'phonic power' theory. Acknowledging the influence of both Quintilian and Ickelsamer and realising the difficulty of putting their theory into practice in English, he set about designing a phonetic alphabet. He devised a symbol for every phoneme in the English language borrowing some Anglo-Saxon runes which had a symbol for /th/ and /ng/ and readopting diacritical marks to indicate the various sound values of the vowels. Hart worked hard to gain acceptance for the new alphabet proposing in his '*A Method or comfortable beginning for all unlearned whereby they may be taught to read*' that after learning 5 vowels and 6 consonants, children should be given a simple word or sentence to read, using only these letters, in order to encourage them. Hart also stressed, as did Ickelsamer, that each consonant must be pronounced "without sounding any vowel before them", as in l-ion, m-oth or n-ail, rather than calling them by their Roman names, el, em, en etc.. After practising with words made up from a few letter-sounds, children would go on to learn the rest of the alphabet, blending and segmenting new words with each additional letter-sound correspondence.

The thought process that led Ickelsamer to his theoretical conclusions and Hart to devise his 'Method', were similar to those that led to the theoretical approach to be investigated in this thesis. However, a more pragmatic alternative to devising a phonetic alphabet has been adopted here, in that the 44 speech sounds in English will be mapped onto their most commonly occurring letter combinations (graphemes). A similar approach to the one to be outlined here was also proposed by Sue Lloyd who had developed it over 17 years in her classroom and published a teaching manual in 1992.

Unfortunately for Hart, not only was spelling reform deemed unacceptable, (Sir James Pitman's phonetic alphabet (i.t.a) met the same resistance in the 20th Century), but spelling actually became more complicated with the inclusion of 'etymological' spellings. Furthermore, Hart's 'Method' was overtaken by the work of Edmond Coote, a self-publicist, chronicled as 'the best-known Elizabethan reading teacher', who published '*The English Schoolmaster*' in 1596. Apart from containing the first graded vocabulary and paying special attention to correct pronunciation of the vowel sounds, this advocated a method virtually identical to the alphabetic 'horn book' method (Davies, 1973).

Throughout the next 200 years the traditional ABC method became more stringent with drills becoming oppressive and spelling hard and cheerless. During this period, children as young as 3 years took as long as 2 years to learn the alphabet and only then started on a worse drudgery - syllables (Mathews, 1966). The length of time devoted to 'skills and drills' is another issue that will be addressed in the intended study.

Whole Word - Look and Say.

In the 17th century, possibly in reaction to the drudgery literacy acquisition had become, the final seminal approach was devised; this was the 'whole word, look and say' method. This method can be traced to 'The True and Ready Way to Learn the Latin Tongue' written by a Professor Lubinus in 1614 and translated into English in 1654. He suggested the child should be shown a book in which visible objects should be fully and accurately described, with the correct linguistic terms put alongside them both in Latin and in Dutch. "Visible things", he stressed "must be known by the eyes". He claimed that the best way for a child to learn vocabulary is "to let him say its name at the same time as he sees it". The 'Orbis Pictus' of Johann Amos Comenius, often credited with the introduction of the 'Look and Say' method, came some 43 years later (Davies, 1973). This approach was introduced to the USA in 1835, by an educator of the deaf, Thomas Gallaudet, who posited that "letters were monsters for small children" and found his 'Mother's Primer' worked equally well for normally hearing children. Fifty odd picture-word sets were presented to the children, and the words were memorised and analysed before being combined into sentences that the children could read. Later the analysis of the individual letters was dropped with the claim that learning whole words made reading easier to teach and more interesting to learn. This would account for the success of the 'Mother's Primer' in terms of sales figures, and the assumed success of the reading development theory supporting it, within the educational establishment (Richardson, 1991). However, Stott in 1981 suggested that maybe the costs, in difficulties that will arise when more complex text is encountered, will outweigh the benefits gained at this baseline level, as children may not be able to transfer the knowledge from learned words to unfamiliar words.

Confusion often arose in the 20th century between the whole word approach and the top-down immersion in literature approach of the Humanists, that became known variously as the 'whole language', 'real book' and the 'psycholinguistic approach'. The ethos behind the whole word approach, however, is quite distinct from the whole language approach in that its aim is simply to match a spoken word with its written counterpart. 'Whole language' theory on the other hand aims to induce a love of literature which will drive the acquisition of reading skill initially through the recognition of whole words and salient letters within the text leading ultimately to the acquisition of the orthographic details.

Even minor innovations for initial literacy acquisition can be traced back through the mists of time. For example, singing a simple tune to aid learning the alphabet (St. Jerome c. 4), the first primer (St Patrick, c432), pictorial illustrations for ABC (Hueber, 1477), and finally the quasi-linguistic systems of turning the letters into pictorial aids and the patterns of sounds into a coherent story Buno, (1650).

Mix and Match Teaching Methods.

Throughout the centuries the different teaching methods were not really in contention with each other: scholars in their ivory towers proposed what they considered to be the definitive approach and teachers simply adopted the one that suited them. There were teaching manuals on the market by the 19th century, such as the 'Eclectic Primer' (W.H. McGuffey, 1881/ 1909) whose stated intention was to enable teachers to pursue the method of their choice, or any combination of three. The alphabetic method was divided into letter-sounds and letter-names; thus the choice presented was between the Phonic Method, the Alphabetic Method or the Word Method. The 'Eclectic Primer', however, did not include the latest incarnation of the Humanist's radical top-down approach, published in an influential book by Edmund Burke Huey, the first psychologist to write a book concerned with literacy. Huey (1908) reviewed the history of literacy and how it was taught in the USA and came to some ideological conclusions. The primary focus for literacy, he proposed, was to extract meaning from whole sentences. Reading, he suggested, "should start in the home and should always be for the intrinsic value of what is being read, never as a formal process or for an end itself. Children should be introduced to interesting and varied subjects in which reading and writing should take secondary place as the need arises or to serve a purpose perceived by the child. However, Huey's informal 'reading for meaning' and 'not as an end in itself' theoretical stance was lost on the publishers of the whole word, look and say basal readers, who had lucrative businesses and growing reputations to protect. In spite of the fact that Huey shunned the primers and basal readers in favour of real text, read in course of the curriculum, his laissez-faire attitude towards literacy was taken as support for the 'anti skills and drills' basal reader approach (Mathews, 1966). Huey's ideal was not to be realised until the 1960's when Ken Goodman and Frank Smith brought about a wholesale revolution in the teaching of reading with the 'whole language' approach.

The Battle of the Methods.

In the 1930's the "Battle of the Methods" had begun to escalate, fuelled by competition for domination of the textbook market (Richardson, 1991). The 'progressive' whole-word, look and say methods supported by the obligatory reading primers spread to Britain after the second World War and were denounced in the late 1960's by both phonic method and 'whole language' enthusiasts alike. By this time "the whole area of literacy development in English speaking countries", according to Stott (1981) "became polarised and politicised". In 1979, Maryann Eeds-Kniep protested that "In some circles, mentioning that you think a code-breaking approach to beginning reading might be appropriate for some children is tantamount to supporting John Birch, or corporal punishment in the first grade".

Putting 400 Year-Old Ideas into Practice.

It was in this still highly charged atmosphere in 1991 that the questions posed for this thesis started to take shape. At that time it was a daunting prospect for a psychology undergraduate, with a theory analogous to the 400 year old theoretical ideas of Ickelsamer and Hart, to 'fly in the face of current received wisdom' and suggest teaching very young children the 44 grapheme-phoneme correspondences (gpc's) in the English language. Was it possible? If so, what was the best age to start?

Chapter 2.

The Battle of the Teaching Methods.

A Critical Appraisal.

Overview.

By the second half of the 20th century teachers throughout England and Wales were teaching children to read with various methods developed through their own experience. However, they were increasingly being influenced by a passionate and sometimes bitter debate in the literature that raged between two mutually exclusive approaches to literacy acquisition. In the main the progressive ideas emanated from America and spread throughout the English speaking countries of England and Wales, Canada and Australia. Two broad approaches occupied the polarised positions, on one hand the advocates of the top-down 'whole language' approach and on the other the bottom-up phonic approach. Promulgators of 'whole-language' (after the 15th C. Humanist philosophy & Rousseau's 'Age of Enlightenment') were bitterly opposed to introducing children to 'decontextualised symbols'. They were also convinced that any introduction to a link between letters and the sound they represent, would be counterproductive (Huey, 1908; Ferreiro & Teberosky, 1979; Goodman, 1967; Meek, 1982; Smith, 1971; Waterland, 1985). For them literacy commenced with interesting literature and exciting stories, engaging with written language at a meaningful level. Children should be free to explore written language in their own way and free to create their own spelling style on the basis that they will pick up orthographic conventions on the way.

Conversely, supporters of 'phonics' (after Quintilian, c. 35-95; Ickelsamer, 1527; Hart, 1570) proposed that "although the sounding out of a word is an artificial convention, it is the nearest we can get to the unconscious feeding in of the true sound values" of spoken language (Stott, 1964). They suggested that children find it fun to assemble letter shapes by sound to make words and names and with guidance can produce the correct spellings (Montessori 1870-1952, see Costelloe, 1966). In this view producing written language should come before children come under pressure to read words that upset their maturing phonic knowledge; those that can spell, can read but those that can read cannot necessarily spell (Flesch, 1955; Montessori, 1912; Stott, 1964). Within this approach there were those who suggested that children need to be aware of the 44 speech sounds in the English language and to imagine their common representations in terms of digraphs, instead of a single symbol to represent each phoneme as in a phonetic alphabet (Flesch, 1955, 1981).

Within each of these polarised views there was a range of practices that would be anathema to others within the same view. For example, Bergeron (1990) found in her review of 64 articles pertaining to whole language instruction that definitions and descriptions of whole language vary widely throughout the literature. She also pointed out that differences exist between school and university based authors' perceptions of this concept. Some whole language teachers were in fact practising a look and say method although others like Phenix and Scott-Dunne (1994), whilst embracing whole language for reading, simultaneously devised creative instruction methods, including phonics, to teach accurate spelling skill. These two highly qualified teachers redefined spelling, not as a low-level, rote-memorisation task, but as a high-level cognitive task, requiring 'a great deal of knowledge about the English language'. This would not have concurred with Smith (1971), a psychologist and chief exponent of whole language theory, who disagreed with any 'decontextualised' concentration on letter names and especially letter-sounds, proposing instead, that "children just have to remember what words look like" (Smith, 1985).

Within the phonics view also, there were those who agreed with the 16th century academics, Ickelsamer and Hart, who advised against pronouncing single phonemes in isolation (Stott, 1964) and those after the Roman scholar Quintilian, (c 35-35) who thought it essential (see also Flesch, 1955; Montessori, 1912;).

As resistance to any phonics approach, notwithstanding the approach to be investigated here, is couched in whole language terms, it is necessary to explore the validity of this philosophy and its practical application thoroughly before proposing a phonics approach. It will then be essential to examine what aspects of phonics approaches are so problematical that they provoke such resistance. The conclusions drawn from the critical appraisal of both views will set the parameters for the current study.

Part 1.

Whole Language.

After 50 years of escalating debate between the phonic and whole word methods, the opposing philosophies had reached an impasse. The time was ripe for Ken Goodman (1970), an educationalist, to recapture the spirit of Huey's (1908) original theory: that reading should be learnt incidentally, in the course of studying curriculum subjects. Goodman's approach, coinciding as it did with the dissemination of Piaget's (1952) 'child-centred' theory, was very compelling and extremely influential. He offers no prescription or formula, which if rigorously followed would teach all children to read. Instead, he posits "a philosophy based on four humanistic-scientific pillars" concerned with language, learning, the role of teachers and a language centred view of the curriculum (Goodman, 1986).

Language.

"Language", Goodman suggests, "is inclusive and indivisible, a holistic personal-social achievement. Words are like subatomic particles, their characteristics can be studied, but the whole is always more than the sum of the parts (a phrase borrowed from Gestalt Psychology that emphasised holistic perceptual processes).

Learning.

He proposes that it is a mistake to try and simplify language learning with controlled vocabulary, phonic principles, short choppy sentences and spelling drills. He suggests instead that readers will bring to bear their own knowledge of the text, their own values and experiences, as they make sense of a writer's text (Goodman, 1986).

The Role of Teachers.

"Whole language teachers are not robots, technicians acting out someone else's script. Basal readers, work books, skills sequences and practice materials that fragment the process are unacceptable to whole language teachers. They plan for growth but do not impose arbitrary standards of performance".

A View of the School Curriculum.

Goodman proposes that integration is a key principle for 'language' development and learning through language. Children should speak, listen, write, or read as they need to in the course of their general curriculum subjects. Money [that would have been] spent on reading, writing, spelling, and handwriting *texts* , he suggests can be used to keep the classroom supplied with a rich range of authentic resources.

Key Ideas.

Goodman's approach was largely in reaction to the reductionist scientific theories of Behaviourism, which dominated the first half of the 20th Century (just as humanists in the Middle Ages reacted against the reductionism of the Church). Behaviourism encouraged the reduction of all things to their smallest component parts and Goodman (1986) saw this as affecting literacy acquisition in adverse ways. He detested the growing use of standardised reading tests that assumed reading could be sub-divided into sub-skills to be measured, the outcome deciding success or failure.

Easy books for beginners to start reading for themselves, Goodman (1986) suggests, are those with predictable stories. This is one of the many points with which phonics exponent Flesch (1981) takes issue, pointing out that the last thing a book should be is 'predictable', as the interest in a story lies in the fact that it is not predictable. In Flesch's view, once words can be decoded rapidly and accurately, children do not need predictable stories, they can read everything without guessing at words.

This view is totally rejected by Goodman, who characterises reading as a 'psycholinguistic guessing game', in order to make sense (construct meaning) readers must take advantage of three cueing systems, the *graphonic*, the *syntactic*, and the *semantic* (Goodman, 1970).

Cueing Systems.

The *graphonic* cues are not just what the reader knows about grapheme-phoneme correspondences, but rather general knowledge of spelling-sound relations. The *syntactic* cueing system is the reader's knowledge of syntactic patterns and the markers that cue these patterns, such as function words and inflectional suffixes. The *semantic* system is everything else, the reader's knowledge of word meanings, knowledge of the topic, etc.. Perfetti (1985), a cognitive psychologist, describes this as a "sort of interactive model, but without specific suggestions as to how things interact". He goes on to say that the main failing of this approach to reading is that it does not recognise that one of the 'cueing systems' is more central that the others. Children who learn the code have knowledge that can enable them to read no matter how the semantic, syntactic, and pragmatic cues might conspire against them. No matter how helpful they are to reading, these cues are not really a substitute for the ability to identify a word.

Goodman's Argument against Phonics.

Reading is about comprehension and therefore children should only read when comprehension is possible, insists Goodman, (1993). He argues that learning to read is analogous to first-language acquisition, that it is a natural by-product of immersion in print experience. He concludes his book 'Phonics Phacts' (1993) with a list of reasons not to teach letter-sound relationships out of the context of actual reading and writing. This list includes the following:

1 Such instruction turns reading from a process of making sense into one of saying sounds for letters.

2 It ignores the meaning and structure of language. Phonic instruction distorts children's processing of language by taking instruction out of the language context.

3 It begins with abstractions instead of functional, meaningful language that's easy to learn.

"The most important fact about phonics is that it should not be taught because it does not need to be taught" (Goodman, 1993). "Children can discover letter-sound regularities from experiencing actual print and doing real writing". Pressley (1998) suggests that this might be too sanguine a view about children's abilities to discover phonic regularities. After all, Beard and Oakhill (1994) point out, when it comes to literacy acquisition, children are old enough to have some of the principles and conventions explained to them. 'We can save them a lot of time and effort by **telling them** what reading is about' (Highlighting in original text).

Writing.

Goodman proposes that 'kids' can write their own books, in frank imitation of their favourites. "Writing is easy ...because it demands no skill prerequisites [sic].....the mechanics are learned on the job and in the process of expressing". Here, Goodman is very short on specifics. It is not explained how, without letter-sound knowledge, children start to express themselves in written language, even with idiosyncratic spelling. It is presumed that enough of the 'graphonic' cues picked up in the process of reading enable the speller to write known spoken words. (Evidence will be reviewed that shows this is rarely the case).

He posits that children notice surprising spellings and become alert to style and structure as they write. Goodman (1986) states that, initially, spellings are generated that are so minimal and unique that even the spellers may not always be able to read what they've written. In English, vowels will initially be left out, and then some vowels will consistently represent vowel sounds that are not necessarily the conventional ones. Research has shown this to be true (Read, 1971) but what Goodman overlooks is that these minimal spellings are capitalising on children's knowledge of phonology and how the sounds in the English language map onto known letters. As this is the case, why not reinforce what children do naturally and **teach** them the sounds of the letters so they have a 'full tool-kit' as it were, to express themselves in written language?

Spelling.

Goodman begs teachers and parents to hold back with corrections and trust children to discover for themselves the correct spelling, just as they discover how to pronounce words for themselves without correction.

Dialect.

An argument is constructed by Goodman (1986), in which he claims that whole language does not exclude dialects, the implication being that literacy development through grapheme-phoneme associations do. However, this is a spurious argument, as the grapheme encountered by a speaker of a dialect will be translated into the phoneme of that dialect e.g. in many parts of England /ng/, a single phoneme, is in fact pronounced /ng/+/g/. If the grapheme is matched to that speech pattern initially, that is what it comes to represent, just as when the ancient Greeks mapped Phoenician symbols onto Greek speech sounds and the Latin alphabet was mapped onto English speech sounds (Davies, 1973). Thereafter, the gpc's will be stable in that dialect as reading develops. The only problem is for the linguists who are likely to classify /ng/ as one sound instead of two.

Advice to Teachers.

Goodman advises teachers "If your program is dominated by basals, workbooks and tests, you will need to shift away from them to authentic reading. Pupils will need more support, but you'll find they are more capable of independence than you thought". However, Beard (1995) suggested that it may be misguided to dismiss reading scheme books in principle as they not only have improved in design and content, they also provide a gradual increase in reading vocabulary, allowing beginners to transfer their learning from one book to the next. Various features of reading scheme and individual books were examined by Perera (1993), in terms of rhythm, story structure, grammar and vocabulary, with good and less effective writing found equally in both. But her research showed that reading non-scheme books that are not linked in any way by vocabulary, grammatical pattern or organisation places an enormous learning load on children. Goodman's advice to teachers, ideally, should be followed by advice to teacher's training

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Miscue Analysis.

Remedial teaching, Goodman (1986) suggests, would be more appropriately conceptualised as 'Re-valuing', that is supporting children to re-value themselves as learners and re-value reading and writing as a functional, meaningful whole language process.

A programme of 'Miscue Analyses' was developed for children who, Goodman hypothesised, had failed to read due to the lack of whole language experience. He confidently predicted that with whole language teaching there were going to be fewer readers and writers in trouble and those few would be found alternatives to get them going, most of all to help them to believe in themselves. Firmly convinced of the validity of this claim, Margaret Meek (1983), an academic and reviewer of children's books, carried out a 3-year remedial study based on this approach which will be reviewed in the section 'Putting 'whole-language' into practice'.

Setting the Framework for 'Whole-Language Theory.

In 1973, Goodman's revolutionary approach to teaching, or more accurately, allowing children to learn to read, was whole-heartedly endorsed and amplified by a contemporary psychologist and educationalist, Frank Smith. Whereas Goodman developed his ideas from a personal teaching perspective, Smith (1971, 1973) underpinned the 'psycholinguistic' or 'whole language' approach with emerging evidence from linguistics, as well as cognitive and developmental psychology.

performance of skilled readers in perception and memory tasks (e.g.Tulving, Mandler & Baumal, 1964; Morton, 1964).

In line with all the new exciting insights of cognitive science, Smith proposed that, if skilful readers' units of analyses were either single letters or words, memory would be overloaded by processing ambiguous meanings and unreliable spelling to sound correspondences. Instead, he concluded that reading was not a visual activity, "too much emphasis on the eyes in reading can make you functionally blind". He proposed instead, that it is a search for meaning, "relying more on what is behind the eyeballs and less on the print on the page in front of us" (1988).

Another influence on Smith's philosophy of reading was the work of Noam Chomsky (1965) who, according to Smith, also rejected the linear model of information processing as being inadequate to explain spoken language. Instead, Chomsky proposed that humans were pre-wired with a language acquisition device (LAD) endowing them with a deep knowledge of the component parts of all languages and a set of linguistic hypotheses. By immersion in their own native language they systematically tested and refined those hypotheses (Chomsky, 1965). Following Chomsky, Smith explicitly proposed that the Language Acquisition Device could also govern written language acquisition Through immersion in real, interesting, meaningful written language, learning to read should be as easy as learning to talk. However, Lenneberg (1967) who was interested in the role of maturation in language development, found a consistently strong correlation between *motor milestones* and *language milestones*, and therefore declared that language is much more like learning to walk than learning to read.

Unfortunately, Smith is inclined to put a 'spin' on legitimate research to make it fit with his theoretical approach. For example, he accurately outlines a theory of *spoken* language acquisition, according to contemporary developmental psychological research but then proposes that *written* language is acquired in exactly the same way. Therefore, throughout his writing, he makes little distinction between spoken and written language, combining the two modalities under the term 'language'. Thus, by a sleight of hand, linguistic and developmental research is used to support his reading development theory. However, there are a number of serious differences between children's encounters with written language, in which the meaning is carried intrinsically, compared with their experiences with spoken language where the meaning is shared and in the immediate environment. The content of text is completely arbitrary for young children, and context cues in terms of syntax are less available, as hitherto they have been fairly redundant amongst all the other non-verbal information conveyed with speech (Perfetti, 1985). Perfetti points out that the words in spoken language that the child hears before encountering written language are not discrete as they are in print, instead there is a flow of speech in which intonation and gesture can sometimes convey more meaning than the words themselves. Things being referred to are usually present in the environment and when they are not, they are present in the world shared mentally by the participants in the conversation. Syntactic processing in such contexts can be relatively unused (Perfetti, 1985). While there may be some special innate mechanism that predisposes humans to talk, it is now recognised that to some extent, children are *taught* to speak (Moerk, 1992). Adults and even older siblings talk to infants in what has come to be known as 'motherese', i.e. high-pitched, short utterances and a controlled vocabulary. As Stott (1981) points out, the falsity of the analogy between written and spoken language comprehension lies in the dispensability for the young child of reading compared with the inescapability of the spoken language. A child, he suggests, can get along quite well without reading, but not without speech.

Teaching Reading.

Smith shies away from the specifics of teaching, except perhaps to say "don't" (Smith, 1971). Meek (1988), applauds Frank Smith for "reclaiming reading for learners, freeing teachers from enslavement to pedagogic methodology, and letting us rediscover reading as something with language as its core". The freedom Meek perceives as being gained is the freedom *not* to teach the alphabet; *not* to teach letter-sound correspondences; *not* to teach grapheme-phoneme correspondences; *not* to correct reading mistakes; *not* to correct spelling mistakes; *not* to discuss letters or words out of context; *not* to allow the beginning reader to focus on the surface details on the page and above all *never* to allow children to sound out unfamiliar words (Meek, 1982; 1988).

Smith's response to the question from a teacher, "Don't beat around the bush. Tell me what you would do if you had to face thirty-five kids in a reading class on Monday morning", he regrets is somewhat impolite. "....I would make sure I knew enough about reading in general and about those children in particular that I would never have to ask an outsider such a question." (Smith, 1978). This challenge was taken to heart by Liz Waterland (1985), a teacher who admitted that the authors who had inspired her to make radical changes in her classroom were not very helpful in the actual translation of theory into classroom practice. Nevertheless, such was the emotional appeal of the theories proposed by Goodman (1967), Meek (1982), and Smith (1973), that she set about what she described as 'the formidable task' of developing a practical approach. The resulting 'Apprenticeship Approach' will be examined after the analysis of Smith's theory, in the section 'Putting 'Whole-Language' into Practice'.

What alarmed teachers and parents who opted for the alphabetic principle, or even the 'whole word', basal reader approach, was that Smith rejected out of hand encounters with print at anything less than a 'whole text' hence 'whole language' level. However, progressive thinkers and whole language philosophers embraced Smith's liberating ideas to the point that what was once radical and innovative has become commonplace. Smith's insights have come to be treated by many as scientific fact (Adams, 1991).

Clues.

Smith (1985) suggests limited clues can be provided by illustrations and readers can acquire experience of using the thread of an argument or story as a clue to the meaning of language by having written language read to them. But Perfetti (1985) argues that somehow the child has to discover the coding principles of the writing system, without which it is impossible, or at least extremely difficult, to become a skilled reader.

Reading is appended parasitically onto an already existing system, agrees Frost (1998), because orthography represents the spoken language; it maps systematically onto phonology rather than meaning. Written language must be phonologically recoded in the mental lexicon for meaning to be accessed (Frost, 1998; Share, 1995).

Smith (1971) argues, according to his 'child-centred' view, that "to a large extent the child has to learn the phonic rules for himself, and he will only acquire them through experience with reading". To a large extent he may be right, but as Stott (1981) proposes, it is the beginning reader's *regular* phonic knowledge that acts as the basis for an induction of the large number of more subtle phonic conventions that, he believes, can often defy conscious analysis.

Smith supposes that children learn a number of words from the environment, where an adult can point out a word to a child and read its meaning. Stott (1981) argues that while the world of print around them is potentially meaningful, it would be only the highly motivated self-learner who will choose to recognise his favourite cereal by its name rather than the colour and illustrations of its box. Ehri and colleagues (1984) found evidence to support this supposition.

After acquiring the concept that words in the environment have meaning, Smith proposes that children go on to read words on the page in the same way that the Chinese read logographic symbols and suggests that the ability to recognise words makes sense of the alphabet. He goes on to make the rather extreme claim that alphabets have been developed simply to help writers remember how words should be reproduced!

Skilled Readers.

Fundamentally, Smith's arguments rest on his assumptions that skilled readers use minimal visual information and instinctively ignore individual letters. Instead, he proposes that, they "make full use of their [semantic] knowledge to reduce their own uncertainty about what successive words might be" (Smith, 1979).

These assumptions are made because, in Smith's inimitable style, he takes some early (non-referenced) studies of visual acuity, mixes them up with other vague (non-referenced) cognitive studies and then leaps to innovative and creative conclusions. These conclusions became a fertile source of scientific exploration in an endeavour to find empirical evidence to support or refute his claims. Accepting the fact that there is a grain of truth that runs through Smith's assumptions, most of the evidence is to the contrary. Firstly, there is robust empirical evidence that skilled readers do attend to the words and letters in the text, (Balota & Rayner, 1983; Carpenter & Just, 1981; Henderson et al, 1995; Pollatsek et al, 1992; Rayner, 1975; Rayner, McConkie, & Zola, 1980) and secondly, beginning reading is essentially different from more mature reading (Chall, 1983a). Learners depend heavily on phonological aspects of language and grapheme-phoneme correspondences (gpc's) as well as the linguistic and cognitive factors that Smith (1971) quite justifiably claims that skilled readers use. Maclean

(1988) calls this a paradox of phonics, "it is useful to teach beginning readers a skill for which they will have little need as competent readers".

Eye Fixations.

Since the advent of computer technology, the study of eye fixations during reading is providing some interesting information about the cognitive, linguistic, and perceptual demands of the reading task. The fact is that when reading the eyes come to rest (fixate) on most of the content words in the text. Carpenter and Just (1981) estimated that about 80% of the text's content words were fixated. Longer words were fixated for a longer time than short words and infrequent words are fixated longer than frequent words. The last word in the sentence receives a longer fixation than other words. Carpenter and Just refer to this as 'sentence wrap up" time. Although each word is semantically encoded as much as possible when it is initially encountered, the wrap up time captures extra processing in which the reader is assembling sentence parts or re-evaluating parts of the sentence that might initially have been incorrectly interpreted. When readers do skip the occasional word, it is never more than that, just one single word (Just and Carpenter, 1987).

Experiments using various computerised techniques have demonstrated a preview benefit from the word to the right of fixation (a parafoveal word); information obtained about the parafoveal word speeds identification of the word when it is subsequently fixated (Blanchard, Pollatsek, & Rayner, 1989; Rayner et al, 1982). Rayner and his colleagues carried out numerous experiments that have varied the *orthographic, phonological, morphological, and semantic* similarity between an initially displayed stimulus and a target word in attempts to determine the basis of the preview effect. There is facilitation due to *orthographic* similarity of the first few letters in an unidentified parafoveal word so that *chest* facilitates the processing of *chart*. By manipulating the case of the letters they found that the facilitation was not due, entirely, to visual similarity but partly to abstract letter codes associated with the first few letters of the word. Interestingly, this was not just due to the proximity of the first few letters as the effect was the same even when readers were asked to read sentences from right to left, but with the words printed left to right as usual (Inhoff et al, 1989). Rayner and colleagues (1992) also found *phonological* similarity speeded the processing of a target word, e.g. *beech* facilitates *beach* and to a lesser extent *shoot* facilitates *chute.* Although it was found that morphological factors can influence fixation time on a word (Lima, 1987) they do not appear to be the source of the preview benefit (Inhoff, 1987; Lima, 1987). However, *no facilitation* has been found for *semantic* similarity. *Song* as an initial stimulus does not facilitate the processing of *tune,* even though such words yield semantic priming effects under typical priming conditions (Rayner et al, 1986). So there is some truth in Smith's assertion that reading is not purely visual as abstract letter codes, as well as phonological and morphological factors all speed word recognition. However, contrary to Smith's assertion, no evidence was found in the eye movement paradigm to support semantic similarity as an aid to word recognition.

Speed Readers.

Smith (1973) cites speed-readers as the ultimate skilled readers, reading 1000 words a minute or more. He proposes that if they plodded through the text, left to right word by word it would be a handicap to fluent reading. Yet after studying the eye movements of speed-readers, Just and Carpenter (1987) found they invariably scanned the page, left to right and top to bottom. Their increased reading rate is owed to their tendency to fixate more briefly and on only about half as many words. However, the information they extract from the text depends entirely on which particular words they happen to fixate, which in turn seems to depend on the number of letters in a word. Provided the text is a familiar topic, trained speed-readers comprehend more high level information than do untrained speed-readers; however, they do not do as well as normal readers (Just and Carpenter, 1987). Thus, contrary to Smith's assertion that the less attention paid to the words on the page, the better, it is clear that each word plays a significant part in the comprehension of the text.

Furthermore, normal readers do process the individual letters quite thoroughly. Even subtle misspellings do not go unnoticed, even though these misspellings might occur in the middle of a long word, which is itself highly predictable from the context (McConkie and Zola, 1981). So, again, contrary to Smith's assertion that a reader's instinct is not to process words, it has been demonstrated that even words that readers can predict with certainty are processed just as thoroughly as less predictable words. Research has demonstrated repeatedly and through many different paradigms that they do so whether they are reading short familiar words or connected text for meaning. They do so regardless of the semantic, syntactic, or orthographic predictability of what they are reading (Adams, 1991).

In fact, Rayner, (1997) concludes, "When George McConkie and I began our research on reading 25 years ago, the view of the skilled reader was one in which reading was only incidentally visual and in which the reader spent most of his or her time generating predictions of upcoming words. Our research, and that of others, has shown that readers are not unsystematically scanning the text looking for the clues to meaning, but rather that they are systematically moving their eyes from left to right across the text fixating on most of the content words (while skipping some function words). We have shown that the region from which readers obtain meaning is rather limited, but that the processing associated with each word is very rapid and that the link between the eyes and the mind is very tight." Sadly, for Smith, the exciting challenge he presented in the 1970's motivated a whole body of research into the visual aspects of reading but eye movement studies eventually showed that skilled readers *do* attend to words and even letters, when they read. Thus, the basic foundation upon which his theory rests has been removed.

If it is accepted that skilled readers do process words thoroughly, as Carpenter and Just (1981) among others have demonstrated they do, then Smith's assertion that beginners must behave from the start like skilled readers is right, but for the wrong reasons. Beginners should not focus on linguistic and cognitive factors as skilled readers do, they need to learn to process gpc's accurately and rapidly as skilled readers did initially, and some would say, still do (Frost, 1998;Van Orden, 1987). Jorm and Share (1983) encapsulated the process leading from phonics knowledge to skilled reading as follows: 'a child who has knowledge of phonics can decode an unfamiliar word. As he or she sounds out the word, its visual pattern becomes more familiar. Repetition of this decoding activity on that particular word leads (arguably) to direct visual access of it. Children develop an orthographic image. That is, they can recognise the word immediately, without sounding it out. If, however, another strategy besides decoding is used, for example, if children identify only the first letter and guess the word from that and from context, they will not be paying sufficient attention to the visual features of the word (the letters) and thus will not develop the ability to recognise it directly. Moreover, decoding also leads to transfer. Because of the fact that the same spelling patterns occur as parts of many different words, decoding practice on one word may enhance recognition of similar words'. Gough and Hillinger (1980) made a similar argument, emphasising that regardless of the strategies that skilled readers use for word recognition, early training in decoding will help to enhance those strategies.

However Smith (1973) may be correct when he notes that "A reader who concentrates on words, is unlikely to get any sense from the passage that he reads". It has been hypothesised (La Berge & Samuels, 1974; Perfetti, 1985) that if a reader must expend a great deal of effort on word recognition, then there will be a reduction in the amount of processing capacity available for comprehension. Adams (1991) points out that if readers have to wrestle with the identities of individual words, they necessarily lose track of meaning, as conscious attention is limited. She agrees that reading should be directed to the processes of comprehension, to constructing, monitoring, and assessing the meaning and message of the text. However, arguing that readers must not focus their attention on individual words is very different from arguing that they should not process them. She makes the analogy that typists do not focus their attention on each individual letter as they type, yet they certainly do type every letter. Further, she extends the analogy to the fact that skilled readers are able to concentrate on meaning only because they have learned to process the words and their spellings very quickly and nearly effortlessly. This automaticity stems from a history of having read words, not skipping, ignoring or guessing them.

Smith's Strategies for Word Recognition for Beginning Readers.

Contrary to Adam's (1991) argument, that automaticity in word recognition comes from a history of having read words, not skipping, ignoring or guessing them, Smith proposes that is exactly what skilled readers as well as beginners do. He suggests that these natural strategies are the best and adds one more, that is, to ask someone (Smith, 1985).

Skipping.

He cites Shannon's (1951) work to support the efficacy of the *skipping* strategy to suggest that a text is comprehensible even if 1 word in 5 is obliterated. "It is best to read on and guess or go back at the end of the sentence" (Smith 1985). He suggests that the context at the end of the sentence will facilitate a hypothesis for the identity of the skipped word. This suggestion is supported by Carpenter and Just's (1981) sentence wrap up time when readers evaluate parts of the sentence that were incorrectly interpreted. But as with so many of Smith's arguments he has oversimplified Shannon's (1951) findings that the structure of English is sufficiently predictable that an equivalent of one word in five is informationally redundant. Shannon (1951) was not suggesting, however, that *any* word in five could be eliminated without affecting the text's comprehensibility, as linguistic information is not evenly distributed across words. In fact, Finn, (1978) calculated that the information in text depends disproportionately on its less frequent words. Therefore, if Smith's advice was followed and readers skipped unfamiliar words, which by their definition means they are likely to be the less frequent words, the text is likely to be incomprehensible. Therefore, Smith puts the nascent reader in a double bind situation. While the child is to depend on the meaning of the passage to infer the meaning of its less familiar words, the meaning of the passage depends disproportionately on the meanings of its less frequent words (Adams, 1991). So it follows that Smith's evidence in support of children who skip as a first choice strategy, is statistically unfeasible and demonstrably unreliable (Schatz and Baldwin, 1986).

Guessing.

The second and according to Smith (1985) the most efficient strategy children are inclined to use naturally is *guessing*. He suggests that teachers dislike this strategy due mainly to misplaced Puritanism. An example Smith gives of acceptable guessing is, for the sentence 'He has no money' guessing 'He ain't got no money'. He does not address the question of how this reader would attempt to write the sentence.

In fact, Smith proposes that prediction makes the third and least favoured reading strategy possible, that of phonics. He argues that children will never be able to deduce the identity of a word like *horse,* as it has eleven alternative pronunciations [sic], unless they can use context to narrow the range of possibilities.

Perfetti (1985) agrees that context has a part to play but suggests that the coding principles provide very narrow choices for any orthographic string. Of course, he admits, *lead* may map onto *led* or *leed* out of context but it can't map onto *window* or *deer.* The skilled reader has adequate knowledge to identify most words without context and adequate knowledge to identify almost all words with very minimal context. In fact, there are relatively few homographs in English: i.e one spelling with two pronunciations and meanings e.g. *read, live, convict* (Cronnell, 1978). He disagrees with Smith's view that guessing is a legitimate strategy for reading, "For the skilled reader, reading is psycholinguistic but it is no guessing game' (Perfetti, 1985).

Stott (1981) more than agrees with Perfetti. Frustrated by the suspension of common sense of Smith's disciples, he exclaims "When a theory is so massively wrong one is faced with a problem - like that of the legendary slayer of monsters - as to which of many heads to cut off first." Stott opts for the psycholinguists total reliance on context, with which goes their contempt for phonics teaching." He proposes that even the most suggestive of contexts allow a number of plausible alternatives. Take the sentence 'The girl climbs the [fence]'. Without initial letter sound knowledge, the options include tree, wall, rope, bars, hill, ladder, etc. With initial letter sound knowledge the risk of an incorrect guess is reduced, on average, some 28 times, but is still unreliable. For example 'The girl climbs the fastest'. Of a group of 30 teachers asked to guess the identity of the final word in the sentence beginning with /f/, Stott found only one correctly guessed 'fence'. He posits that the beginning reader who cannot read 'fence' is likely also to fail at 'climbs' rendering the contextual cues most ineffective, 'The girl - the -.' Not having the means of getting further than this must lead only to frustration, and avoidance of the whole area of reading (Stott, 1981). Share (1995) suggests that the most authoritative study on this issue is Finn's (1977-1978) analysis of data originally reported by Bormuth (1966). In this study, the 'cloze easiness' of over 5000 words was evaluated in a sample of 675 children in grades 4 to 8. The average predictability was only 29.5%, that is guesses were twice as likely to be wrong as right.

These findings are supported by Tyler and Marslen-Wilson's (1982) study of prediction in speech. They conclude that listeners do not guess, and that listening is not and cannot be, top-down: that it is 'interactive with bottom-up priority'. Those conditions are necessary, they point out, in order to avoid 'hallucinating what we hear', and in order for there to be ultimate overall control by the 'signal' - the spoken word. So according to the view that readers see 'partly what they expect to see', reading would be neither like listening nor optimally efficient.

Sounding Out.

Smith (1985) advises that "the best way to work out an unfamiliar word is *not* by trying blindly to use phonic rules but by analogy with known words of a similar spelling or, more precisely, appearance. Indeed, the similarity of a new word to words that are already known provides clues to both meaning and sound; it is the words that are known that makes phonics seem effective with new words". He contradicts himself on two counts with this assertion. Firstly, he proposes that reading is not a visual activity, the less attention paid to the surface structure the better. And secondly, by guessing, for example, 'ain't got' instead of the word 'has' there is little opportunity to generate an analogy for the unknown word 'has'. However, there is some support for the theory of reading by analogy with known words from Glushko's (1979) analogy model. This model proposes that a word is processed faster when it shares the body (i.e. rime in Goswami's terms) with a priming word, at least in later stages of learning to read. Goswami (1993) also supports some aspects of this proposition, in that children's knowledge of rhyme enables them to make analogies between words with the same endings (rimes) even for beginners. However, a growing body of evidence seems to indicate that analogy strategies might be dependent upon letter sound decoding ability (Ehri and Robbins, 1992), are unlikely to be used without the analogous word present (Muter, Snowling & Taylor, 1994; Savage, 1997) or are contingent on the size of the child's reading vocabulary (Bowey and Hanson, 1994) and therefore are a late emerging development (Bowey & Underwood, 1996; Coltheart & Leahy, 1992). This aspect of reading development remains highly contentious and will be discussed in depth in the following chapter.

Smith (1985) allows that children who know the alphabet and who are good at phonics tend to be good readers but suggests that the ability to read is the *cause* rather than the *consequence* of the particular skill. However, he fails to offer any evidence to support this claim. Then paradoxically he argues that spelling has nothing to do with making reading possible, though reading can certainly facilitate learning to spell. This does not make sense in the light of his conviction that readers do not attend to individual words and that they completely ignore letters within words. He acknowledges this himself when he says "If we do deliberately attend to spelling then we probably are having difficulty with what we read and employing an inefficient strategy to overcome that difficulty". For this reason he concludes that spelling and reading should be kept completely separate. Without so much as a word as to how spelling is to be achieved, separately from reading, without recourse to phonics or even letter names, he closes the subject with "children just have to remember what words look like in order to spell them. Phonics is not much help for spelling, children who spell by ear are the worst spellers". This last statement will be taken apart in a following chapter as empirical evidence from psychological studies will turn it on its head! However, to address the main issue of spelling having nothing to do with making reading possible, an unpublished study by Uhry and Shepherd was cited by Williams (1991) in which they gave spelling instruction to first and second grade pupils in a whole language classroom. This group were not only better at reading regular and irregular words than a control group, but they were also better at reading text aloud, indicating that a gain in fluency had also resulted from the training.

Ehri and Wilce (1985) conducted a series of experiments looking at the differences between children who used a visual strategy for spelling and children who used a phonetic strategy. They interpreted their findings as evidence that spellings are retained in memory when spellers construe letters as sound symbols.

Many phonic methods of reading instruction start with spelling instruction (Flesch, 1955; Montessori, 1894-1952; Stott, 1964). Far from expecting children to 'just remember what words look like' they involved encoding the sounds of oral language into written language. This offers two advantages, firstly, practice on analysis of the phonemes that make up the word and secondly, the opportunity to acquire the visual or orthographic image of the word that is essential for proficient reading (Williams 1980). The psycholinguist's error, according to Stott (1981) is to equate the teaching of phonics with drills and rules. Intelligently done, it is a matter of guiding the child's 'self-induction' of the phonic correspondences. Stott's assertion is a key feature of the approach to be investigated here.

Critical Summary.

Both Goodman and Smith did much to generate a more child-centred and less authoritarian environment in the classroom, making learning to read a happy, enjoyable activity. Sadly, the reality of focusing wholly on real books and dispensing with phonics has been less successful in the real world of education than they hoped.

Beard (1995) points to Tizard et al's (1988) three-year study of thirty-three inner city schools in Britain. She found that, where teachers used non-scheme, real books in a happy atmosphere, there was little evidence that this ensured that children make a connection between meaning and print, or develop an understanding of written language. This finding was re-enforced by a study of 120 schools by HMI in 1991, who noted that exclusive 'real book' approaches run the risk of giving too little attention to the systematic teaching of skills for tackling print (Beard, 1995).

Stahl and Miller (1989), however, have done more than most to summarise the effects of whole language on standardized measures of reading achievement. They reviewed all the comparisons they could find of conventional reading instruction, using a basal reading approach and whole language approach (33 comparisons at kindergarten level and 65 at grade 1). They concluded that whole language was more effective in kindergarten than Year 1 as it is effective at conveying a general understanding about reading and writing but not word recognition skill. In a later study, Stahl, McKenna, and Pagnucco (1994) found that in kindergarten, whole language seemed to produce some better outcomes for some reading readiness measures but not for phonological awareness i.e. awareness that words are made up of sounds. In grades 1 and 2, there was a very modest positive effect of whole language on comprehension and a modest negative effect on children's decoding abilities. Stahl et al (1994) found nothing to favour whole language after kindergarten.

This is an age of value for money, audits on performance, and studies of relative effectiveness, all things that are anathema to whole-language philosophy. As pointed out by Edelsky (1990), 'Test score data promote test driven curricula that subvert whole-language goals and feed into mechanisms for stratifying society'.

However, the ethos generated by whole-language proponents encourages a sensitive approach to the teaching of the component skills that empirical studies have demonstrated are required for reading. Recent longitudinal studies have shown a significant advantage for children who have been given phonological awareness, and letter-sound correspondence training. They all focused on enjoyable ways of interesting beginning readers in the way spoken language maps onto written language (Blachman, Ball, Black & Tangel, 1994; Brady, Fowler, Stone & Winbury, 1994; Byrne & Fielding-Barnsley, 1991; Johnston & Watson, 1997; McGuinness, McGuinness & Donohue, 1995; Stuart 1999; Watson & Johnston, 1999). Although all these studies involved different populations in terms of socio-economic deprivation, different English speaking nationalities, second language learners etc., they all found that early structured teaching accelerates skills acquisition and leads to a significant improvement in reading and writing. Further, once these skills are in place, they act as a framework for the development of a self-teaching printed word recognition system (Share, 1995; Stuart, 1999).

The differences between the studies cited above and the present study hinge on the age of the children, the time scale of the programme, the short duration of each session and the comprehensive set of grapheme-phoneme correspondences and aspects of literacy to be introduced.

Putting 'Whole-Language' into Practice.

Miscue Analysis

The following example of Goodman's miscue analysis in action was described by Meek (1988) and claimed as evidence for its success, prior to developing it further in a 3-year remedial study with older children.

Ben.

Meek describes Ben, who was referred for extra tuition because of, as Meek put it, 'his slow progress with a phonics checklist'. During the session with Ben, they discussed all aspects of the book, 'Rosie's Walk' by Pat Hutchins, the author, the dedication, insights into the story, etc. and they read it 5 times. Before they started to read Ben recognised the distinctive title as he had seen it before.

> "By the end of the afternoon he could tell the story and nearly match the words, so we said he could read it by himself. I don't mind if you say he just memorised it" (Meek, 1988). "Ben had a genuine reading experience which made up for the disappointment, the exclusion, the failure with the phonics check list." - "He had met an artist-author whose text had helped him to learn significant reading lessons. At the end he possessed the text - He had also learned how a story goes in a book; that is, the reader tells it to himself, and every time he went back to the beginning, there it was again. Yet every reading yielded something more". Meek asked, "Do you agree with me so far that these are reading lessons?

It can certainly be agreed that this was a reading lesson, focused on many aspects of storybook reading. It highlights literacy conventions and implicitly demonstrates the differences between written and spoken language and how some of the story that is not explicitly expressed in the words can be gleaned from the pictures. It is a wonderful, one to one, reading lesson that helps to develop the imagination and inspire a love of books. Ben was able to 'read' the title in the same way children can 'read' environmental print, by recognising the environment and style of script, not the written word (Mason, 1980; Masonheimer, Drum & Ehri, 1984). At the end of the session he could 'read' an approximation to the words on the page by memory whilst undoubtedly having a wonderful literacy encounter and a lesson in comprehension. However, Meek does not explain how Ben can transfer this experience to his next literacy encounter, which may present an entirely different set of words and story line. He is still unable to independently discover for himself the story in the next individual book. Meek insists that 'real' books are good reading texts for learners because they introduce children to the discourse styles of various genres. But, as previously noted, this puts a huge learning load on the beginning reader (Perera, 1993). At least with a reading scheme, the reading vocabulary is repeated and extended with each book and therefore with repeated, structured presentations, words may become familiar. There is also some evidence that children take less notice of the words when there are picture cues present than when there are not (Samuels, 1967) but this would be the same for both reading schemes and individual books.

Three Year Remedial Study.

In Meek's account of her three year remedial study, also based on Goodman's 'miscue analysis' approach, entitled 'Achieving Literacy' (1983), it can be seen how the 'whole language' ideology stands in the way of providing the 'inexperienced reader' with a strategy to approach the task of reading. In fact, any strategy the children used in terms of their poor knowledge of phonics was sidelined and declared to be unhelpful. In fact, all references to phonics were disparaging e.g. he was 'engaged in phonic stammering' or 'indulged in an orgy of phonics'. Meek collated the experiences of the four teachers who, with their eight chosen pupils, took part in the study, with the aim of inculcating a love of literature in their pupils, before either the teacher or the pupil gave up.

The following brief extracts from the experiences of two of the teachers demonstrate the difficulties in which they found themselves.

Trevor was convinced there was a secret about reading that his teacher, Judith, kept to herself. Judith had spent the first year trying to, "excise the dominance of Trevor's mother who had insisted that 'memorising sound' was the key to 'literacy'." The early sessions become wholly unpleasant because Trevor insisted on learning phoneme-grapheme correspondences and 'did it so badly'. She explains that her aim was "*to train Trevor's eyes away from the features of words and to convince him that he could predict his way through a story".* No wonder Trevor was convinced there was a secret about reading he was not privy to!

The second teacher, Elizabeth, was so overwhelmed by the task that she had to fortify herself with doses of 'Frank Smith' to remind herself that she was on the right track. She felt paralysed because, as a disciple of Goodman and Smith, she was convinced that "if he knows about the story before he starts, he will be able to detect his own miscues and to correct them."...but... "When he got stuck, he tried to get himself out by sounding out the words. I was torn between encouraging him in what he was trying to do (which was likely to fail with this vocabulary) and getting him to concentrate on the context (in which, as far as I could see, very few clues were to be found)" (original brackets). Finally, admitting defeat, she related that "....he got himself so bogged down that he did not notice he was not making much sense".

As Montessori (1912) found with her group of inner-city children, these children were not engaged for long by the exploits of fictional characters, no matter how fun or relevant they were. Even when the teacher read the stories they still resisted the pages stretching before them. Boredom was not one of the things that the teachers in Meek's (1983) study expected to encounter, in the absence of skills and drills and presence of good literature, but that is what they had to face. "...that constant condition of all inexperienced readers 'Aw Miss, it's *boring'*," which Meek, paradoxically, claims is said "with special urgency when the story begins to draw them into it, when they know they will want to go on." Meek then perversely claims this as a success, "to offer the young the chance to become competent readers is also to give them the freedom enjoyed by expert readers of *sometimes choosing not to read.* Teachers tolerate this idea with difficulty, but tolerate it they must."

But surely, it was because they chose not to read that they were in the remedial class in the first place!

On a flying visit to London, Goodman, to his credit, pointed out that they were falling into the very mode of teaching that they wanted to avoid and the pupils were still, successfully, evading the real task. Typically, he did not however, offer any solutions. After 3 years, the few children still attending the sessions were only able to independently read the stories they had *dictated* themselves for the teacher to type. The ideological stance taken by the group disabled them from providing the pupils with any solid strategy for writing for themselves or for coping with written language in general. Meek blames the adolescents' reading failure on the fact that "they were efficient sounders and blenders and decipherers of initial consonants; so efficient, indeed, that words they could have recognised 'at sight' were subjected to the same decoding as those they had never seen or heard before." It is difficult to understand what Meek means by this assertion. It appears that some of the pupils could recognise and pronounce the initial consonant of each word and some, with poor phonics skill, tried to decode words. If exposure to whole words leads to recognising them as wholes as she insists it does and these children's phonic skill was so poor they had to attend remedial classes, why did they fail to recognise whole words after 3-years training? Meek's answer to this is simple "it was the absolute conviction that they could not be successful readers no matter what they did."

Unfortunately, although Meek claims a perverse kind of success for this study, her 'evidence' simply is not good enough to validate Goodman's claim for 'Miscue Analysis' as a remedial strategy.

The Apprenticeship Approach.

Beard and Oakhill (1994) responded to the need for a critique of Waterland's booklet (Waterland, 1985), strongly supporting the whole language approach, when it became the most recommended text on reading lists for initial teacher training students in England, Wales and Northern Ireland (Brooks et al., 1992). Concern had been expressed that there had not been any objective and systematic investigation into its effectiveness or long term effects (Williamson & Carrington, 1991).

<u>Apprentice Readers?.</u>

Beard and Oakhill and others take issue with the apprenticeship analogy (Coles, 1990) on the grounds that learning a manual craft is substantially different from learning to read. The term 'apprentice reader' has been around for a long time, however. Davies (1973) uses it to describe what are currently called 'beginning readers'. As a historian, he carried the term over from the knowledge that in the middle-ages children were 'put out' as apprentice scholars in the houses of their parent's peers, to work for their keep and reading tuition. Beard and Oakhill imply that Waterland must have acquired the concept from Downing (1979) whose use of the apprenticeship metaphor in learning to read was both more directive and more cautious. Downing had adapted Fitts and Posner's (1967) model of human performance, in which learners first attend to the function and techniques of tasks that must be undertaken in order to become a skilled performer. The first stage is then followed by two others, practice and automaticity. Waterland acknowledges that the apprentice "first undertakes the simplest parts of the job, then gradually more complex ones, increasing the share he can cope with...". This explanation, applied to reading, would seem to imply that the child would undertake words with simple letter-sound correspondences and simple high frequency sight words, then gradually attend to more complex spelling to sound patterns with increasingly complex reading material. However, this is not Waterland's interpretation of apprenticeship. Quoting Huey (1908), she simply proposes that the child sits with an adult listening and watching the adult read and gradually taking over the role of reader. In this approach she points out that complexity of the text is immaterial: "After all you don't tell a child that they mustn't learn to say three syllable words before they say one syllable words; we don't say the next word you must learn is cauliflower." Beard and Oakhill discovered that in engineering, the field that Waterland cites in her analogy, far from listening and watching and taking over the role of the expert, contact between the skilled worker and the apprentice is very brief and confined to the sub-level of the job in hand. They also found that, as Fitts and Posner (1967) proposed in their model of human performance, practice and repetition of sub-skills is very important. What is missing from both interpretations of the apprenticeship analogy is the concept of insight. When apprentices work with a master, they have a unique opportunity to gain valuable insights into the task in hand. An apprenticeship analogy could be valid if it was interpreted to mean '*a novice who is given the opportunity to gain an insight into a complex task by being led through a series of problem solving processes by an expert*'.

Waterland quotes Vygotsky (1896-1934), (translated in 1986) "What a child can do in co-operation today, he can do alone tomorrow." However, Vygotsky's focus was on the analysis of models of 'the acquisition of concepts' i.e. how children gain an insight into complex learning tasks. So it is also questionable that Vygotsky's work can be used to support Waterland's approach. He disagreed with Piaget's influential assumption that development and instruction are entirely separate processes. He suggests that the function of instruction is merely to introduce *adult ways of thinking,* which *conflict with the child's own* and eventually *supplant them* (Vygotsky, 1986). For Vygotsky, studying children's thought processes separately from the influence of instruction, as Piaget did, "excludes a very important source of change and bars the researcher from posing questions regarding the interaction of development and instruction peculiar to each age level". His research, like Stott's (1964), focused on this interaction. In writing, he proposed that children must take cognisance of the sound structure of each word, dissect it, and reproduce it in alphabetical symbols. "This brings an awareness to speech, involving a deliberate structuring of the web of meaning". Children's concepts are formed during the process of *instruction,* in collaboration with an adult and, as the instruction is internalised the child is enabled to solve problems earlier than otherwise possible. This approach recognises a 'zone of proximal development' where learners perform within their range of competence while being assisted in realising their potential levels of higher performance (Vygotsky, [translated] 1978).

Several theorists both in the West and in Russia have carried Vygotsky's sound-symbol, problem solving theory forward (Davydov, 1988; Downing, 1979; Downing and Valtin, 1984; Elkonin, 1963; Elkonin and Davydov, 1962; Mattingly, 1972). This theory can more accurately be described as an apprenticeship approach but it is quite remote from Waterland's conception of an apprenticeship approach.

When Waterland suggests that once teachers understand the five propositions that comprise her model of reading they will have "a refreshed view of the task that beginning readers undertake" Beard and Oakhill argue that they will have nothing of the sort. They suggest that Waterland's model of reading in fact offers the teacher a misguided view of what reading is all about.

Key ideas: The Five Propositions.

1) For her first proposition, Waterland takes up Goodman's (1982) contention that literacy acquisition is an extension of natural language learning for all children, with both oral and written language being learned in the same way".

Immediately the difference between Waterland's apprenticeship approach and Vygotsky's is apparent. There is no question of imitation in Vygotsky's theory, the supporting adult is seen as encouraging the child to ask questions and solve problems about the sound structure of language and the way it maps onto letters and words. This process will enable the child to reach a level of knowledge that the adult possesses and the child lacks.

However, as discussed above, children are not unavoidably surrounded by written language from birth, as they are with spoken language and neither, as Donaldson (1993) pointed out, is written language a bodily function in the same way that spoken language is. (She invites us to imagine 'brow folk' who have a little screen on their forehead with words scrolling across it, even when it's shut we're told the words carry on scrolling across the screen for the edification of the individual!). It would be intuitively plausible then, to postulate some innate mechanism that is triggered to facilitate learning to speak, (Chomsky, 1957; Smith and Miller, 1966), whereas reading may involve a more general learning mechanism (Beard and Oakhill, 1994; Donaldson, 1993; Rayner, 1997). Beard and Oakhill also suggest that in learning to speak, there is no equivalent process to the visual-pattern to sound-pattern mapping that they argue is necessary for reading. By the time children come to reading they will have learned to speak and understand their language very proficiently and, capitalising on that knowledge, the task is to map the written words onto the spoken words and meanings that are already familiar. Samples of children's sentence production, using the Breakthrough sentence maker, were analysed by Reid, (1974) who found that children did not learn to construct the grammar of their language all over again in written language, e.g. producing word strings like ' no like milk' as they do in spoken language. Reid (1974) found instead that children composed sentences that were short but grammatically well formed, 'transferring to the written mode, linguistic knowledge already acquired in spoken form. This demonstrates the dependence of written language on spoken language and argues against the similarity of written language acquisition to that of spoken language.

Reading is appended onto spoken language also, in that the sounds of the language are represented by alphabetic letters (Frost, 1998) which makes it far easier to learn to read a language that you can already speak (Beard and Oakhill, 1994). It is possible to read text fluently without understanding a word of the language but with sufficient knowledge of letter to sound mapping and pronunciation. Flesch (1981) claims he read Czech fluently without understanding a word and in the days when the Catholic Mass was in Latin many English speaking Catholics read the text aloud with only a very general grasp of the meaning. However, Beard and Oakhill (1994) agree with Reid (1974) that in a known language, written words, once deciphered, will map onto meaning and sentence structures that are already familiar.

It is also worth noting that the whole concept of written language was only developed 5000 years ago, and in Britain the English only started to learn to read literature in their native tongue in 1362, a mere 600 years ago (Davies, 1973). This is a comparatively short period for a group of human beings to have evolved the use written language naturally compared with the development of spoken language.

2) For her second proposition Waterland takes up Frank Smith's proposal that a teacher's responsibility is not to teach children to read but to make it possible for them to learn to read. She agrees with Smith that children cannot be taught to read in a formal sequenced way and she goes on to say that she does not intend to teach them to read at all in the normally accepted sense.

Although she promotes the use of Breakthrough materials to encourage children to make their own books and gain an insight into the left-right progression, sentence structure and simple syntactical rules, she is adamant that no other skill teaching is necessary. Breakthrough is a good sentence construction game but it has serious limitations as the only means of producing written language. Firstly, although it is possible for children to ask the teacher to make individual cards for the words they need to complete a sentence, the initial pool of word cards severely constrains the child's own vocabulary. Secondly, when searching for a word, the child is focusing on the meaning of the sentence to be constructed rather than the spelling pattern within the words. Spelling is problem solving with letters, sounds, patterns, and meanings (Phenix and Scott-Dunne, 1994). Therefore, it would seem that Breakthrough may be useful as an aid to word recognition in reading, but unlikely to contribute to the skills needed for writing and spelling and these skills are more important than ever in the workplace today (Wright, 1988). No one would expect children to watch and listen to a pianist play a piece of music from a music score, and then gradually take over playing for themselves. It is expected that any beginner will learn the names and values of the notes and how they correspond to the piano keys. This is because in music there is no ideology that claims that because concert pianists are not observed looking at the music note for note, that is the way beginners should learn. It is not expected for a beginner to play a piece of music and gradually realise the correspondence between the dots on the stave and keys on the piano, even though a number of gifted musicians can play by ear. Another point to be considered when insisting that written language can only be learnt holistically in the context of good literature, is that when written language was originally devised, it was probably for commercial reasons. It was certainly commercial considerations that initially encouraged Latin scholars to code the language of the British Isles onto the Latin alphabet (Davies, 1973).

Beard and Oakhill (1994) conclude that "The majority of children still learn to read because they are taught, not in spite of it - by developing and building on skills commensurate with their level of cognitive development".

3) The third proposition is basically that reading is a process of getting meaning. The inspiration for this proposition comes again from Goodman 1982 "We put a book in a six-year-old's hand and say, 'Here, read it'. When he or she can't we say 'See, that child can't read'. We're ignoring the fact that children can read McDonalds and Burger King etc., and all kinds of things that have meaning for them". Meek (1983) also proposed that there are "hundreds of children who have learned to read from advertisements on hoardings". Thus, Waterland agrees with Meek, Smith and Goodman that literacy acquisition develops as a consequence of living in a literate environment. This concept has been challenged by psychologists, who have demonstrated that children who are experts at reading environmental print, are in fact, reading environmental cues, not the print (Mason, 1980; Masonheimer, Drum, & Ehri, 1984). Children who are unfamiliar with the alphabetic principle are unable to read brand names if they are printed in a different format from their usual 'logo' and mistakes go unnoticed when letters are changed in the original logo, e.g. Xepsi. For this reason, Ehri (1987) proposes that as soon as children move to reading (that is attending to graphic information), they shift to

using letter-sound cues. So it is spurious to propose that because these logos are salient, children are able to read them.

As with other theorists who perceive literacy acquisition as emerging from purposeful literacy environments (Clay, 1975), Waterland fails to explain when and why guesses at print cease to be features of emergent literacy and instead become indications of the need for some kind of intervention (Beard, 1984). Once the skill is mastered, however, children are free to develop new interests, by being able to read new books independently, not just focus on books that reflect current interests. Individual books may be interesting but today, so are scheme-books like the Oxford Reading Tree, that are designed to be reasonably predictable but scaffold the learner through new graded vocabulary. Which leads to the next point.

4) For the fourth proposition, Waterland proposes that the quality of the text is crucial: "The logical challenge to the teacher is to provide such a wide range of real books that children will find their own book, which will be meaningful for them".

Beard and Oakhill (1994) argue that a child who chooses a book that is far beyond their present level of reading ability will only become frustrated and disillusioned in their attempts to read it - however much they might enjoy it if it were read *to* them. Beard points out that for the teacher to simply read all high content or difficult words for the child (or to encourage the child to guess these unfamiliar words - on which the meaning of the text often depends) is an inadequate method of developing independence in reading. Contrary to Waterland's proposition, if shared reading is the main approach, the use of inter-related reading scheme books would seem to be the most effective way of supporting it.

5) The final proposition inspired by Meek (1982) is that of the adult as a guiding friend. Waterland suggests that eventually the child will tackle new text independently, just as the toddler will make new language constructions.

One striking difference between children making language constructions and tackling novel text, is that children are motivated to make new utterances by needs, food, drink, toys, getting up, being uncomfortable, joining in etc. and adopt strategies and utterances that achieve these ends. In order to read independently, children need to learn the mappings between the sounds of their language and the way those sounds are represented in written symbols, in what is after all an alphabetic language. Only a child with considerable decoding skills would be motivated to tackle novel text. In their critique of Waterland's Apprenticeship Approach, Beard and Oakhill, however, commute their call for phonics by distancing themselves from the idea of starting with an emphasis on phonics instruction. "What we now know about beginning readers' abilities suggests that the conceptualisations of words as composed of small sounds (phonemes) is beyond them". The intended study for this thesis is designed to investigate whether this assumption is correct. Is the concept of phonemes within words beyond small children, even as young as three and a half years old?

Critical Summary.

In 1989, a second edition of Waterland's booklet was published, along with an 'informal resource' book, 'Apprenticeship in Action' in which she reports receiving correspondence from several thousand teachers, advisers, lecturers and parents. In many ways this is not surprising as 'The Apprenticeship Approach' is inspiringly and fluently written by a teacher passionate about her subject. However, there is no objective appraisal of the Apprenticeship Approach and it is unclear what emerged from the correspondence apart from the few contradictory, published contributions. Waterland's main contribution was that she translated the theoretical works of her mentors into classroom practice, in a small, low cost booklet, that was accessible to the many teachers who were inspired by 'whole language' theory, but baffled as to how to implement it.

Imperceptibly, however, at the turn of the millennium, the literacy tide is also turning, and phonics is beginning to lose its taboo status. If this is to be the case, how are all the difficulties inherent in English that have been encountered throughout history and exaggerated by whole language advocates, to be overcome?

Part 2.

Phonics.

The critical appraisal of phonics to be made here is not intended to be a comprehensive survey of phonics methods. Three influential approaches have been chosen for examination, that together represent the diversity of phonics theories.

The contribution of the first approach was the lack of skills and drills and the informal method of introducing the alphabetic principle to children as young as 3-years old. The second was strong on skills and drills, and had a rigid procedure, but proposed the initial introduction of 44 speech sounds and their corresponding graphemes, to be pronounced in isolation. The final approach blames the lack of success of phonics on the difficulty of pronouncing English phonemes in isolation and suggests that phonemes should always be introduced as part of a syllable or word. The most useful aspects of each of these approaches will be incorporated into the model of literacy acquisition to be developed in this thesis.

An informal induction of the alphabetic principle.

The Italian doctor, Maria Montessori (1870-1952) developed her approach to literacy acquisition through the need to engage a group of very young, very under-privileged children in her care. She wrote later, "In the beginning, a written language is distilled from its spoken counterpart like separate drops that eventually run together to form a distinct stream of written words and sentences" (translated by M.J. Costelloe, 1966). Montessori went on to describe how she discovered by accident the fun children found in assembling letters by sound to make names and words, when she supplied them with letters cut out of cardboard. One group of children had rejected the beautifully illustrated books they had been given in spite of valiant attempts to interest them in the pictures and stories. With the impoverished environment in which the children lived, they were uninitiated in the art of formal storybook reading and failed to be engaged. Montessori described how, as they learned that each of the cardboard letters corresponded to a spoken sound, they became excited and enthusiastic about writing messages and engaged in forming the names of friends. It was only after 6 months that the children began to understand what it was to read, and then only in connection with writing. They would watch the teacher's hand as she wrote words on a slip of paper and they would rush off to a corner to try to decipher the message. "Very soon the children were found to be spontaneously reading any available print" (Montessori, 1912, 1966). Montessori proposed that "Language is primarily something that is spoken; its written counterpart is only a literal transfer of the sounds into visible signs. Writing", she went on, "was understood by the children simply as another way of expressing oneself, another form of speech which, like speech itself, was passed directly from one person to another". When reading, on the other hand, the child has to deal with the unknown, with the thoughts of another, and this is a much more complex process. Montessori proposed that writing should come before reading, "if he can write, he can read".

Orthography.

It can be argued that Montessori's approach is relatively straightforward in Italian as it has a shallow orthography, with a direct mapping of sound to print. However, English has a deep orthography, that reflects more than simple mapping of sound to print (Venezky, 1970). The structure of English is such that the arrangement of the letters is constrained by orthographic rules which describe English word spellings and summarise an important sort of knowledge for the reader. The spelling tends to reflect underlying morphological structures as well as grapheme-phoneme correspondences. Thus the spelling of *nation* and *national* preserves their underlying lexical identity rather than signalling their differing individual pronunciations. (Perfetti, 1985). However, this does not make the orthography less systematic than a shallow orthography but merely different in its system (See Katz & Feldman, 1981). It also does not preclude a similar approach to Montessori's if viewed from a spelling first perspective, constraining the words to those with a simple grapheme-phoneme correspondence.

Critical age.

Through her experience as both a doctor and educationalist she strongly believed in a 'critical period' of literacy acquisition, between 3 and 6-years, after which it becomes increasingly more difficult. The validity of this assumption is difficult to examine empirically and therefore remains an unresolved issue. The age for which it is appropriate for children to start learning about written language has been a subject of debate since 280 BC when Chrysippus the Stoic (Quintilian's *Institutes, i*) proposed the age of three and Plato in his *Laws* (vi) (422-347 BC) suggested six. As it is intended here to follow Montessori's informal spelling first approach, it is expedient to 'catch' them before formal reading lessons begin in Reception. Therefore the participants will be in the second term of kindergarten and between the ages of 3-years and 4-years.

Contribution.

Although Montessori was criticised in her time for allowing the children to wander around and choose their 'work' for themselves, she set a precedent for a more free and easy style of learning. She encouraged children to gain an insight into written language for themselves whilst at the same time encouraging them to be accurate and careful in the work they produced.

Grapheme-Phoneme Correspondences, Skills and Drills.

Rudolf Flesch (1955, 1981) proposed that the proliferation of alternative methods (whole-word & whole language) of teaching reading had begun to worry parents, who did not understand why their children could not decode written words and were unfamiliar with letter/sounds or the alphabet.

In his controversial book, 'Why Johnny Can't Read', Flesch produced evidence of the "impoverished state of current 'whole word' basal reading books" and laid out what he proposed was "the only way to teach reading". He revives the bottom-up alphabetic principle approach to literacy acquisition and explains its phonic basis. Flesch claims his aim is to set out, in a way that parents can understand, "the way in which reading has been taught since its inception".

He suggests that "the word method was designed to maintain the status quo". Only the privileged were able to take advantage of it, condemning the less privileged and less able to illiteracy and menial work, thus "ensuring that power and control remained in the hands of an elite few". He claims that there is a fundamental connection between 'phonics' and democracy, "Equal opportunity for all is one of the inalienable rights, and the 'word method' interferes with that right". Unfortunately, he upset the educational establishment as well as the very people he was championing by implying that this goal was achieved because only middle class white males were able to cope with the word method but females and ethic minorities needed a more explicit approach (Flesch, 1981).

Key Ideas.

Like Montessori, Flesch proposed that in any alphabetic language the first step is to become aware of individual speech sounds. Secondly, corresponding letter symbols must be matched to each of the sounds they represent. Thirdly, the letter/sounds must be written and combined into words and at the same time, read back as words. Unlike Montessori, he was faced with a language that had a deep orthography, with almost twice as many sounds as it had letters to represent them.

Forty-Four Speech Sounds.

By counting the items in the pronunciation keys of two dictionaries, Flesch arrived at 44 speech sounds (phonemes) used in the English language. He invited parents to conceptualise this by imagining an English phonetic alphabet with 44 different symbols to represent each sound.

Out of the 26 letters in the alphabet available to represent the phonemes he suggests that at least 3 are superfluous, namely /c/, /q/, and /x/. (e.g. /c/ has the sound of either /k/ or /s/, /qu/ stands for /kw/, and /x/ sounds like /ks/ in six and like /gz/ in exist.) This, Flesch proposed, leaves 23 letters to represent 44 sounds. So he set about the task of classifying all the grapheme-phoneme correspondences (gpc's) in English, i.e. the single letters and digraphs (two letters) or trigraphs (3 letters) that represent each phoneme in the English language (see Appendix 2 for full list).

"The theory quite simply is, if 'Johnny' learns these 44 sounds and how they are represented by symbols, practises combining them into words by writing and reading them back, he can read anything" "And", Flesch (1955) concludes, "that's all. Everything else will come to Johnny automatically, because he can now read anything".

Presumably, included in the "everything else" that "will come to Johnny automatically" would be the ability to comprehend connected text and to access other sources of information stored in memory that would make sense of the text, such as the structure of his language and his knowledge of the world. Syntactic and semantic information in written language provide valuable cues that may predict the course of the text and help confirm that the decoded word is correct (Ehri and Wilce, 1980a; Goodman, 1970; Perfetti, 1986).

However, learning to process graphic information in individual words accurately, automatically and rapidly is one of the most difficult aspects of learning to read (Stott, 1964). It is the skill that separates good readers from poor readers (Stanovich, 1980) and therefore is a skill that must be acquired in order to become a skilled reader (Adams, 1990; Ehri, 1983; Perfetti, 1986; Share, 1995; Stott, 1964). This was the issue that Flesch (1955) was addressing. By teaching children how orthography mapped onto speech patterns through dozens of examples of each grapheme-phoneme correspondence, he was convinced that word recognition would become accurate, automatic and rapid. Indeed, it has been demonstrated that correlations between spelling and reading are high, ranging between .66 to.90 (Shanahan, 1984). So good spellers should be good readers.

A Problem for this Approach.

There is a factor regarding learning to read that Flesch overlooked when he proposed that children should learn the spellings of several hundred words before they start reading text for themselves. Although he proposes that children love the active process of translating sounds into symbols and writing words, he fails to take account of the fact that this pleasure will wear a bit thin over weeks, if not months. In fact he does not acknowledge the limitations of the child's attention span when he suggests writing structured lists of words in order to commit them to memory. He simply proposes that a six-year-old can accomplish the task in less than a year. Unfortunately, he failed to offer any empirical evidence to support this proposition.

Contribution.

Flesch's contribution was twofold. Firstly, he reaffirmed the basic alphabetic principle for literacy acquisition to counterbalance the dominant whole word basal reader approach. And secondly, he set out "for any interested person to understand" the systematic way that graphemes (both single letters and digraphs i.e. two letters representing one phoneme) mapped onto phonemes in English. It is this aspect of his approach that was the inspiration for this thesis. The main failing of his approach was that, in spite of his admiration for Montessori's approach, he failed to perceive the value of the progressive 'zeitgeist' in education that shunned adherence to skills and drills, and sought to make learning self-motivated and fun.

Postscript.

Unfortunately, Flesch's scathing, sarcastic style of writing alienated not only the 'whole language' enthusiasts but the entire educational establishment. Sadly, "rational debate of these issues was crushed and a desperately needed area of research was paralysed and polarised" (Adams, 1990).

Phonic Sight Habits.

"The sounding out of a word is an artificial convention, the nearest we can get to the unconscious feeding in of the 'true sound values'. The great majority of children can accept this convention but a few never get the idea" (Stott, 1964). Stott proposed that "reading difficulties lie in the mastery of the regular phonic basis of reading. It is at this stage, not when he comes to the irregularities, that the slow learner sticks". Stott (1964) developed 'The Programmed Reading Kit' through which, with the aid of 'a graded series of apparatus', "children gained such positive satisfaction from their mastery of the regular phonic basis of reading that they were able to embark upon its variations and conventions with confidence". The 'apparatus' included cards, games and phonetically pronounceable sentences, using about 250 key words that make up 70% of children's reading.

Key Ideas.

Stott talked about "fusing letters and sounds as they are seen and heard in words" and 'phonic sight habits', i.e. frequently encountered combinations of letters that could be read in a direct visual way. In current terminology, Stott was referring to segmenting the sounds in words, linking the sounds to single letters, digraphs and morphemes (the smallest linguistic unit of meaning) and blending these correspondences into written words.

> "...the reading of a 'whole word' is really the end result of a process of dispensing with individual phonic cues ....multi letter cues being less well attended to . Ultimately, whole words themselves become 'sight habits'. To teach children to distinguish whole words [as was current practice] by contrasting shapes is to lead them up a blind alley".

This proposition was much broader than Flesch's (1955) approach, bypassing grapheme-phoneme correspondences by adding to children's sight-habits a meaningful unit of language, the morpheme, which can be larger than a phoneme. For example, the digraph /ng/ represents a phoneme in a word but the morpheme /ing/ has an effect on the meaning of the word. For example, /ing/ changes the tense of a verb to the 'present participle' (walk – walking) or changes a verb into a noun (to meet - a meeting), and therefore affects the meaning.

Stott disagreed with Schonell (1949), a proponent of the whole word method who had drawn the conclusion that the phonic method was of no help with regard to the commonest irregular words in English, for two reasons;

1. "Once a number of digraphs, ie. ch, th, sh, become 'sight habits' the consonantal parts of words are nearly always straight forward and can act as signposts, if the word is in the reader's spoken vocabulary. In some phonetic languages like Hebrew, only the consonants were written originally as a guide to a reader in his native language."
2. "Secondly, there is some sort of pattern in the irregularities. One example in a group ie. /come/ helps acceptance of others, /some/, /other/, /money/" (Stott, 1964).

Stanovich 1991 agrees "the prevailing view is that no words are completely phonologically opaque but rather there is a regularity continuum".

(As a point of interest, the words cited above, along with *wonder, done,* and *love,* were all victims of William Caxton's (1476) printing press. Caxton, the first printer of the English language, brought about some standardisation of spelling and due to his poor quality 'u' he arbitrarily changed the 'u' to 'o' in words like those above (Phenix & Scott-Dunne, 1994)).

Whereas Montessori developed her approach through experience with deprived children and Flesch, by academically analysing the grapheme-phoneme correspondences in English, Stott examined the validity of his approach empirically throughout its development. He observed children throughout their literacy instruction and studied what their sticking points were. As a psychologist, Stott was primarily concerned with disruptive, slow learning children, many of whom he found to have an aversion to reading material of any sort. He therefore devised procedures, which had a 'strong compensatory appeal', where learning was built into playing self-correcting games in small groups, in an atmosphere of friendly rivalry. He posited that, by first studying how slow learners learn to read, one had the advantage of observing, in slow motion, the stumbling blocks encountered by normal young readers.

Therefore, Stott's starting point for developing his teaching approach was to monitor a 'laboratory' group of 10 non-readers, aged between 14 and 16 years old with low IQ's, as they moved through the first version of his 'programmed reading kit'. The educational principle behind the theory was the belief that "the learner must be led to make his own observations about the facts he requires, and organise them himself in his own mind so that they are available when required". Stott and his team "no longer believed that by explaining something, no matter how simply or slowly, it would be understood". Stott credits Ronald Morris (1954) for outlining this theoretical approach to learning but the Russian psychologist, Vygotsky (1896-1934), should also be acknowledged as a major proponent of this view, which, led to his work being proscribed in the USSR for a number of years (Bakhurst, 1996).

Contemporary dogma held that phonics should not be introduced (if at all) until the child had reached a reading age of five and a half to six years old but Stott's laboratory group had not been able retain any sight words in order to have a reading age at all. However, Stott found that, having been given an insight into the phonic basis of written words, their 'sieve-like' memories vanished and the children retained what they had learned, even after summer holidays.

First stage.

Letter-sounds were not taught in isolation. Instead, they were learned and reinforced through various games, such as touching one of a choice of two letters *(/m/ or /s/)* in response to a spoken word starting with one of the letters (*monkey or spade*). In another game akin to Pelmanism, where the pupil has to pick the card /b/ to find the picture of the target word *bed* on the face down side. For the first time these children could feel a sense of success as they learnt for themselves which letters matched the sounds at the beginning of spoken words.

Second Stage.

The second stage of fusing two letter-sounds together brought the easy learning to a halt. The double letter cues that Stott had decided to introduce as 'sight-habits', were vowel/consonant (VC) blends e.g. /ad/ /ag/ (opposite to the historical alphabetic second stage that introduced CV blends first e.g. /ba/ /be/ etc.) However, close observation soon revealed that the historical order of syllable acquisition was best as the children found it extremely difficult to deal with a word like /bat/ by acquiring a 'sight habit' of [the rime] /at/ and then putting the /b/ in front to make /bat/. This point will be taken up later in discussion of Goswami's (1999) theory of the importance of rimes in initial word recognition.

Stott and his team found that the children had a 'strong disposition to fasten onto the first letter of a word as if it were a sign post'. So the games and teaching aids were re-designed to focus the children's attention on the *first* two letters (CV), blended together as a 'sight habit', e.g. /ba/, which with the addition of a single consonant /t/ blended at the end, made a word, /bat/. This approach brought instant success, the left to right progression of the revised method solved the blending difficulties, although there was one remaining problem to be overcome. The initial CV was easily learned as an instantly pronounced 'sight habit' /ba/ but when the children blended the final consonant, they tended to over pronounce it e.g. ba-TER. This was overcome by having the children whisper it. Stott observed "how quickly the pupils mastered this process and how reliably they could operate it once they had done so. Understanding seems to depend so much upon the exact mental set with which a problem is approached. Soon the pupils were able to build simple words phonetically as an instant habit". Stott stresses the point that the children could see the printed word 'bat' and say 'bat', not because they had learned to read it by sight, but because they were beginning to develop the ability that skilled readers have, to instantly blend phonemes and morphemes [sight-habits], together into words.

This stage differed in a fundamental way from Flesch's approach. Stott's focus was broader in that his intention was to build 'sight-habits' from the moment children moved on from learning single letter-sounds e.g. the combination of a vowel and consonant that could be part of a CVC word e.g. '**ba**' for ***bat***.

Flesch's basic building blocks, on the other hand, were grapheme- phoneme correspondences, which he proposed facilitated the pronunciation of any word. He took for granted children's ability to learn to blend single phonemes into an instantly recognised whole words and focused only on making 'sight-habits' out of the digraphs that represent single phonemes (for example /**oa**/ as in /**b**/ /**oa**/ /**t**/ - ***boat*** or /**sh**/ as in /**sh**/ /**i**/ /**p**/ - ***ship)*** although he did also include in lists some frequently encountered blends e.g. /**sk**/, /**fr**/, /**spl**/, etc. to be instantly recognised as units of pronunciation (Flesch, 1955).

Remedial Outcomes.

Stott had observed his 'laboratory' group of teenagers learning to read with his programmed reading kit for a year, when they were due to leave school. 'Half the pupils had begun to cope with words involving the phonic conventions, while the rest had a fairly certain competence with simple phonic words'. Throughout this year Stott and colleagues had refined the reading programme to a point where they were confident to involve a number of other 'Backwardness Research Groups' and primary schools, as well as taking on new groups of their own. In order to put the 'programmed reading kit' to the severest test, the most seriously 'ineducable' children were referred to the experimental groups: that is, children with learning difficulties as well as those referred to as anything from 'troublemakers' to those 'with a complete apathy towards anything to do with reading'. It transpired that these children never willingly missed a lesson and apathy, tension and fear vanished (which is more than can be said for Meek's (1988) 'miscue analysis' remedial group). The reading games were adjusted, and not considered a success until they could be played with complete absorption by the children.

The policy was to avoid reading from books in the initial stages and this was a great help in giving the children more confidence. They learned to read without realising it, "This is better than reading, Sir" and "This don't seem like learning, Sir" and the surprise when they did "I picked up a comic and read it last night, Sir, I couldn't do that before I came to the group".

Differences in Approach.

An important difference between Stott's approach and, as he put it, "the phonic method that has brought the phonic principle into disrepute" is the fact that he tried to avoid associating isolated sounds with isolated symbols.

> "This gives some children the wrong idea and makes fusing more difficult for them. We wanted them to make associations between the sounds as heard in words and the letters as seen in words. This is an unconscious

> process which 'just happens' as an act of thought. To connect a symbol with an isolated sound, wrenched out of its context, is a different act of thought, and one which is not necessarily helpful to the associating of sounds in words with letters in words. There is, on the other hand, no difficulty in getting children to understand the idea of a letter symbolising a sound if they have discovered sounds for themselves as ways in which words begin or finish or are filled up" (Stott, 1964).

This assumption sprang from the observation that when children had learnt letter sounds mechanically, they were inclined to add a schwa. In other words, the pure sound of /m/, as pronounced in '/m/ that looks delicious' was normally taught as "mer". This lead to confusion when the child was asked to blend "mer" /u/ "ger" for *mug.* Stott had a pupil who could not get further than "mer"-"ug" when trying to blend the three letters, even though she knew it "was something to drink water from". This thesis will propose a technique to overcome this difficulty and avoid the pronunciation of a 'shwa', as it is intended for phonemes to be pronounced in isolation.

Stott acknowledges, as does this thesis, that there is an advantage for beginning readers of having a few, irregular, high frequency words as 'sight words', not by just taking them as 'wholes' but using what phonic cues apply and by giving these words special treatment. He also proposes that some words need the special status of having 'Tricky Bits' and these can be grouped together as word families on 'Tricky Bits' cards, with the tricky bits highlighted to show the multi-letter cues that need to become sight habits.

Stott (1981) regrets that others have described his approach to literacy as an 'analytical' approach to reading, as the description implies that a process of deliberate and conscious analysis is required. He stresses that this is not the case and points out the speed with which words are read by phonic analysis when whole chunks of words have become sight-habits. This is quite different, he suggests, from other people's "Mistaken attempts...to get children to 'break down' words in this way [when reading]." He points out that the raison d'être of his approach is to lead children to an understanding "of basic phonic facts and inculcating the habits for their use, independently of actual reading material". "The advantage is that through 30 graded stages, children will acquire all the skills they need, easily and without strain", before they come under pressure to read written stories containing words that will upset their maturing phonic knowledge. He had also picked up on Montessori's freedom of movement in the classroom and fun in the course of learning and could on no account be accused of imposing skills and drills that were anathema to the advocates and publishers of the whole word basal reader approach.

Problems for the Programmed Reading Kit.

On the practical side the programmed reading kit involved countless bits and pieces of 'apparatus', card sets and games, each with detailed instructions on their correct use. Infant teachers had to "look searchingly at the different items and think well over their purpose and the suggested method of use" according to Mary Wignall (in Stott, 1964) a head teacher of a primary school who had experimented with the 'Kit' for two years. She found that, if she studied the manual carefully and introduced each new concept according to the instructions with a small group in her own office, the children could then have additional practice with their teacher in class. She found she needed to refer to the manual quite often to ensure she was working through the procedures correctly. She agreed with Stott, that phonics had a bad name because it was so often taught badly but she thought the 'Programmed Reading Kit' overcame these difficulties. She fitted it in alongside a 'look and say' approach and found that the children had more confidence in tackling new words, new books and that correct spelling was more likely. However, Mary Wignall suggested that it was inappropriate for a whole class activity as it would be difficult to keep track of all the bits and pieces and cope with the noise level that, Miss Wignall claims, the games give rise to. One of the important features of the approach to be outlined here is that it is intended as a whole class activity.

Contribution.

The theoretical approach that supports the Programmed Reading Kit i.e. introducing the sounds of letters as they are heard within words, forming sight-habits of digraphs and morphemes, and learning to construct words and recognise words-segments as sight-habits, are all features of current phonics based literacy approaches (Deavers, Solity, Kerfoot, Crane, & Cannon 1999; Lloyd, 1992; McGuinness, McGuinness, & Donohue, 1995; Watson & Johnston, 1999). However, these phonics approaches have favoured pronouncing the phonemes in isolation, without the schwa, as closely as possible to their true sound within words, as did Ickelsamer (1534), Montessori, (1930's) and Flesch, (1955). By *not* introducing letter sounds in isolation, Stott necessarily had to devise 'apparatus' to help develop the children's insight into the concept of phonemes e.g. cards with /b/ on one side and a bed on the other etc.. This may be a vital aid for children with learning difficulties but average children seem to handle the concept of a phoneme by simply linking the sound with the letter or digraph e.g. "mmmm" with 'm'. As backup and revision, though, many of Stott's card games and ideas would be useful in an early-years classroom today.

Postscript.

Writing in the 1960's, in an educational environment where 'whole word' and 'look and say' basal readers were ubiquitous in spite of there being no evidence as to their effectiveness, Stott described his literacy approach rationally and had researched it thoroughly. He examined the 'whole word' approach in the penultimate chapter of his book and demonstrated that it was a psychologically implausible way to teach children to read (See Stott, 1964). In his final chapter, he critically appraised in equal detail the 'Initial Teaching Alphabet' (i.t.a.), the new 'medium' for teaching reading, devised by Sir James Pitman. He concluded that basically it was a phonic approach that lacked both method in the teaching and books in the new phonetic alphabet, and hence would never achieve mainstream status. He would have been surprised just how much 'acceptance' it did achieve in the latter half of the 1960's. However, after its initial blaze of glory, i.t.a. disappeared from mainstream education without trace.

From his perspective, Stott, having dismissed the i.t.a., also presumed that what he termed 'sight methods' had run their course and it would not have been unreasonable for him to suppose that his large-scale study offering definitive support for the efficacy of his phonic approach, would put the final nail in the coffin of alternative methods. He suggested that with the advent of the alphabetic principle in 1500BC, literacy ceased to be the mysterious privilege of a highly specialised class - and with an air of triumph over adversity he declared......

> "it is a horrifying thought that if the reaction against phonics had been able to establish itself we might be throwing our educational progress back some 3,500 years! In effect, once the gain of a phonic system of writing has been made, a reversion is inconceivable. The very existence of such a convenient system of cues makes it inevitable that despite any temporary reaction, its essential logic will prevail in the end" (Stott, 1964).

The essential logic of the phonic principle was not to prevail, however, until the turn of 21^{st} Century, by which time Stott's 'Programmed Reading Kit' had joined the 'i.t.a.' and the 'look and say' reading manuals, on academic library shelves, for their historical interest only.

Soon after Stott published his 'Programmed Reading Kit', the two very influential whole language theorists Goodman (1967) and Smith (1973), discussed here at length, did in fact reject the alphabetic principle, "the miracle accomplished by the twenty six letters of the alphabet" (Burke, 1984) "that conquered the world" (Gelb, 1952). Spelling-first, phonic approaches to literacy were marginalised and maligned in many English speaking countries and main stream literacy acquisition focused almost exclusively on the development of 'reading for meaning'.

Conclusion.

At the time of writing, the National Literacy Strategy for schools in England and Wales, supports an eclectic teaching approach. This includes an initial concentration on whole language and onset and rime training (onset and rime will be described in the following chapter) with phonics teaching spread over a period of up to 3 years. Teachers are advised to teach specific grapheme-phoneme correspondences each year, over a period of 3 years, with digraph vowels (e.g. /oo/) only appearing towards the beginning of Year 2. As 'look' is most often one of the first sight words in Reception, as borne out in this study, this strategy seems less than optimal. One of the aims of this thesis is to review the evidence for the efficacy of these diverse approaches and focus on the optimum strategy for literacy acquisition. Evidence concerning the validity of early onset and rime training will be discussed in the following chapter as well as the evidence based conclusions leading to the proposed optimum approach to be investigated in this training study.

One of the conclusions drawn from the comprehensive interrogation of the whole language theory in this chapter is to reject, once and for all, the notion of whole language as the *sole* means of literacy acquisition. Another conclusion drawn in this chapter is that there are aspects of phonics that work and others that do not. The informality, fun and relevance to the children were features of Montessori's approach that should be carried forward. Her observation of a critical age range of between 3 and 6 years for literacy acquisition is also important. Becoming aware of the 44 sounds in the language and attaching them to their most common representations, as posited by Flesch, is a theory supported by psychology. Segmenting and blending sounds as they are learnt, into relevant words and sentences to become 'sight habits', building on skills and expanding vocabulary prior to the more daunting task of decoding text, is a feature of Stott's approach worth borrowing. On the negative side, skills, drills and word lists are out, along with the slow pace of delivery over months and even years (as outlined for the NLS). Instead, a new feature will be the rapidity with which each gpc will be introduced, at the rate of one a day and the short time span for each session, between 5 and 10 minutes. Also, a new objective, a whole class strategy that will induce in children, through actions, sounds and stories, the alphabetic principle and a model of how written language is constructed, prior to formal literacy instruction. Once children understand the concept of blending and segmenting gpc's and have a model of written language in their heads they will be able to take advantage of all the positive aspects of whole language philosophy and any other approach that will contribute towards refining their literacy and literary skills. A third conclusion is the need to take account of the converging empirical evidence from psychological research into the cognitive mechanisms that support written language acquisition before proposing any new approach in the classroom. This last point will be addressed in the following chapter, at the end of which the proposed model of literacy acquisition will be outlined in detail.

Chapter 3.

Phonological Awareness & Literacy Development: A Psychological Perspective.

Introduction.

Two sources of influence were instrumental in introducing the concept of phonological awareness (PA) to psychology. One source emanated from the former USSR with a focus on literacy development, and the study of children's cognitive growth through instruction. The other source was the United States, and focused on the phonological ability required for skilled reading. As the concept of phonological awareness became generally accepted in psychological research into reading development, it sparked off a whole new debate regarding causality: which comes first, PA or the alphabetic principle?

The Origins of the Theory of Phonological Awareness.

Phonological Awareness in the USSR.

The first psychologist to highlight the importance of phonological awareness to literacy development was Vygotsky (1896-1934) in what became the USSR. Although there are echoes of Ickelsamer's (1501-1542) theoretical ideas, Vygotsky was aware, from a psychologist's point of view, of the impact of skill acquisition on the development of cognitive structures in the brain. He described collaborating with children to 'bring awareness to speech' in order to develop the mental structure for literacy acquisition. Although his work was denounced soon after his early death from tuberculosis, others soon revived his ideas when the State's excesses of intellectual repression subsided (Bakhurst 1996).

Phoneme Awareness - Crucial to Literacy Development.

Both Elkonin, (1963) and Zhurova, (1963) were among the first to revive the theory that awareness of the phonemes in words is crucial to literacy development. Throughout the 1960's Elkonin collaborated with Davydov (see Davydov, 1988) a learning theorist, in a training programme that encouraged school children to refine their sense of speech awareness down to the smallest sound in their language, the phoneme level. Once phonemes had been identified and isolated in words, sometimes using counters to keep track of the number, they were mapped onto the appropriate symbol. This emulated the method used at the genesis of the alphabetic script. Then, adopting a problem-solving approach, children practised segmenting and re-combining sound-symbol associations at phoneme and syllable level, until the letter strings were automatically associated with speech segments or words.

In Genesis the Genuine Structure of Mental Functions is Revealed.

Davydov (1988) described the rationale for his learning theory approach as follows;
"The familiarisation of children with questions asked by the person who was the first to resolve a given task is a benchmark in the children's retracing of the process whereby the mode used in resolving the given task originated".

He agreed with Vygotsky that the optimum way to study the mental processes involved in skill acquisition, in this case the acquisition of written language, is to observe children under instruction, as they solve the problems originally encountered by the first person faced with the task, e.g. retracing the steps taken originally to develop and use an alphabetic language. This observation may then reveal the cognitive structures underlying mental functions. "Only in genesis is the genuine structure of mental functions revealed" (Davydov, 1988).

Although Davydov claimed that experimental studies of phonological awareness training revealed superior performance in overall literacy level, number of error-free submissions and quality of work done by slow learners in studies in classrooms across Moscow, insufficient data is supplied to make any comment regarding the validity of these claims.

Contribution to Psychology.

The importance of this body of work is the psychologically plausible proposal that phonological awareness training develops the cognitive structures that facilitate literacy acquisition (Vygotsky, 1986; Davydov, 1988), and that these cognitive structures can be revealed in the process of modelling the original strategy in the task domain i.e. phonological analysis and the representation of phonemes by graphemes to reproduce spoken words in a written form.

Phonological Awareness in U.S.

In the West, throughout the 1960's, the prevailing view was that reading and listening were parallel processes (Fries, 1962). However, Mattingly (1972) made the point that the relationship between the two processes is much more devious than was generally assumed. Speaking and listening, he proposed, are primary linguistic activities; writing and reading are secondary and rather special sorts of activity that rely critically upon the reader's awareness of the primary activities.

Mattingly followed Miller & Chomsky (1963), Stevens & Halle (1967) and Neisser (1967) in viewing primary linguistic activity, both speaking and listening, as essentially creative or 'synthetic'. Much of the process of synthesis takes place well beyond the range of immediate awareness (Chomsky, 1965) although the speaker/hearer does have some awareness of phonetic and phonological events. At the phonological level, Mattingly tentatively proposed that words, and to a lesser extent morphemes, are most obvious.

Syllables depending on their structural role may be more obvious than phonological segments (phonemes). There is far greater awareness of the whole structural unit than of the structure itself.

Phonological Awareness and Reading.

Mattingly proposed that reading was a language-based skill requiring a raised level of phonological awareness, rather than a form of primary linguistic activity analogous to listening as suggested by Goodman (1967) and Smith (1971).

Though written material is in a form which appeals to a reader's linguistic awareness, Mattingly suggests that considerable skill is still required to proceed through the text at a practical pace. Firstly, a reader must be thoroughly familiar with rules of the writing system: the shapes of the characters and correspondences between the graphemes and phonemes in the language. Writing systems are a matter of convention and must be more or less deliberately learned. But a reader can not proceed unit by unit, but must instead acquire instant recognition of sight words through literacy experiences. Although eventually the sight words will become habitual in the skilled reader, they are never inaccessible to awareness in the way that much primary linguistic activity is.

"The preliminary written representation of a sentence will contain only a part of the information in the linguist's phonological representation. All writing systems, whether morphemic, syllabic or phonemic, omit syntactic, prosodic and junctural information, and many systems make other omissions. In English, for example, vowel sounds are under-represented and in some Semitic scripts, vowels are omitted altogether. Thus the preliminary representation recovered by the reader from the written text is a partial version of the phonological representation: a string of words which may well be incomplete and are certainly not syntactically related" (Mattingly, 1972 pp142). The skilled reader, however, does not need complete phonological information and probably does not use all of the limited information available. The preliminary phonological representation serves only to control the next step of the operation, the actual synthesis of the sentence. By means of the same primary linguistic competence used in speaking and listening, the reader endeavours to produce a sentence that will be consistent with its context and with this preliminary representation. As the sentence is synthesised, the reader derives the appropriate semantic representation, and so understands what the writer is trying to say.

Mattingly's ideas were in accord with proposals put forward at a conference on the Reading Process in 1968 (Kavanagh, 1968) where Liberman proposed that "speech is a complex code, print is a simple cipher" and therefore "reading is parasitic on language". And Halwes observed that "It seems like a good bet that since you have all this apparatus in the head for understanding language that if you wanted to teach somebody to read, you would arrange a way to get the written material input to the system that you have already got for processing spoken language...".

Contribution to Psychology.

Mattingly, (1972) offered an alternative to the prevailing theories of skilled reading. Contemporary theories either saw reading as driven by higher conceptual processes that anticipate and confirm the meaning of text, or lower level stimulus analysis of the visual features of letters (Stanovich, 1980).

Implicit in Mattingly's theory is the idea that written material, even sight words, is mapped onto the transformed phonological codes extracted from speech (Chomsky, & Halle, 1968), almost instantaneously, and it is these phonological units that are a major part of the cognitive, linguistic code that accesses meaning.

Mattingly's fertile theory generated an interest in the role of phonological awareness in reading that lasted to the end of the century and beyond. His theoretical stance on the primacy of speech and his proposal that an incomplete visual representation is completed and synthesised by cognitive linguistic processes, is echoed in current research that has returned to a strong 'phonological recoding' theory of reading (Frost, 1998).

A New Debate.

As the importance of phonological awareness (PA) to literacy achievement became generally accepted in psychology, a new debate was generated concerning the impact of individual differences in children's level of phonological awareness on reading development. Research focusing on the causal role of PA was generated from two potentially conflicting theoretical positions and the implications of each needed clarification for classroom practice. The first emerges from research which attempts to establish instructional priorities on a *developmental* perspective (e.g. Goswami, 1993) and therefore focuses on developing phonological units that enable beginning readers to make the connection between print and sound. The second emerges from an *instructional* approach, which proposes that, regardless of the level of PA that develops naturally, the most useful level of PA, the phoneme, needs to be brought to children's attention from the initial stages of learning to read (see Deavers and Solity, 1998).

Developmental v. Instructional.

Rhyming skill was identified as a level of early PA (Kirtley, Bryant, Maclean, & Bradley, 1989; Stanovich, Cunningham & Cramer, 1984) followed by initial letter sounds and intra-syllabic units (Goswami, 1986; Treiman, 1983, 1985; Treiman, Goswami, & Bruck, 1990), but young children seemed not to be able to perceive the smallest unit, the phoneme, within words without prior alphabetic experience (Byrne & Fielding-Barnsley, 1996; Goswami & Bryant, 1990; Treiman, 1985b). However, a growing body of research indicated that children who are better at detecting phonemes learn to decode words more easily even after variability in reading skills that is due to intelligence, receptive vocabulary, memory skills, and social class is partialled out (Bus & Ijzendoorn, 1999). Also, findings of predictive relationships between phoneme awareness and subsequent reading ability are robust (e.g. Hoien, Lundberg, Stanovich, & Bjaalid, 1995; Muter, Hulme, Snowling & Taylor, 1997).

If the phoneme was one of the essential linguistic units for lexical access, as some cognitive and developmental psychologists propose (Byrne & Fielding-Barnsley, 1991; Frost, 1998; Duncan, Seymour & Hill, 1997; Engelmann & Carnine, 1981; Seymour, Duncan & Bolik, 1998; Share, 1995; Solity, 1996a, 1996b; Solity & Bull, 1987) and if there is however little evidence of phoneme awareness developing naturally, prior to alphabetic experience (Ehri, 1979), the implication for literacy development leads to dichotomous alternatives.

Developmental Perspective.

The first, a developmental perspective, posits that children initially set up recognition units for words that are coded in terms of two phonological units, the onset and the rime (see Wimmer & Goswami, 1992). Awareness of onset and rime, according to Bradley and Bryant (1985) emerges prior to beginning to learn to read (see Goswami & Bryant, 1990; Goswami, 1993). As reading develops, and spelling is taught, a more fine-grained phonological analysis becomes possible, and children begin coding graphemes in terms of phonemes. Goswami (1992) proposes that this "can be seen as an interactive developmental process, in which a child's knowledge about orthography is affected by, and in turn changes, that child's phonological knowledge, leading to an increasingly refined process of lexical analogy" (Goswami, 1992). So a beginning reader who learns to read a word like 'beak' will represent this word in terms of two phonological units, the onset, 'b', and the rime, 'eak'. The better reader who learns 'beak' will represent three phonological units, corresponding to the graphemes 'b', 'ea', and 'k'. Thus the younger child will only be able to use 'beak' as a basis for reading 'peak', the older child will also be able to read 'bean' and 'heap' (Goswami, 1993). Goswami concludes, that "While the ability to make connections between onset and rime units and their spelling patterns provides a useful entry strategy to reading, the ability to perform a more comprehensive grapheme-phoneme analysis of the spelling patterns of different words must be necessary in order for a child to become a good reader".

Instructional Perspective.

The second, an instructional approach, suggests that introducing children to letter-sound or grapheme-phoneme correspondences and how they blend together to make words from the very beginning, (Bielby, 1994, 1998; Carnine & Silbert, 1979; Chew, 1997; Deavers & Solity, 1998; Flesch, 1955; Johnston & Watson, 1997; Lloyd, 1992; Seymour, Duncan, & Bolik, 1998; Stott, 1964; Stuart, 1999) offers a foundation from which a self-teaching mechanism is generated (Share, 1995). This could also encourage the development of a new and detailed mental structure reflecting the phonetic features of articulation, that are hypothesised to be the basis of the abstract linguistic code for lexical access (see; Frost, 1998; Share, 1995).

The phonological awareness axiom was therefore a fertile source of experimental investigation into reading development, from the late 1970's to the end of the century. Empirical evidence was needed to clarify the following questions for classroom practice:

1. Which comes first, phoneme awareness or the alphabetic principle?
2. Is there a causal connection between PA and literacy acquisition?
3. What level of PA facilitates word recognition?

1. Which comes first, phoneme awareness or the alphabetic principle?

Overview.

To carry out an empirical investigation into phoneme awareness it was necessary to find a group of participants who could read and a comparable group who could not, to examine whether there were any differences between them.

One experimental paradigm compared groups of poor readers with normal readers (Bradley & Bryant, 1978; Byrne & Ledez, 1983; Cossu, Shankweiler, Liberman, Tola, & Katz, 1987; Marcel, 1980).

Another identified a community where illiteracy is common due to lack of educational facilities as opposed to low IQ (Morais, Cary, Alegria, & Bertelson, 1979; Morais, 1991).

A third focused on communities who use a logographic rather than an alphabetic script, like traditional Chinese orthography, compared with pinyin which is an alphabetic spelling system (Read, Zhang, Nie & Ding, 1986) or Japanese kana in which symbols represent syllables compared with alphabetic English (Mann, 1986).

Older poor readers v. younger normal readers.

Bradley & Bryant (1978) found that older children, with severe reading disability, were less able than younger normal readers to identify which of four words lacked a sound shared by the other three words. Byrne & Ledez (1983) and Marcel (1980) found similar results with poor readers who were less able to identify initial, medial and final phonemes in spoken words. Bradley & Bryant (1978) also found that the poor readers were worse than the normal readers at supplying a word that rhymed with a target word. It was assumed that the older readers had been exposed to a similar amount of print as the younger normal readers, so Bradley & Bryant concluded that the cause of reading failure was insensitivity to rhyme and alliteration.

These results seem to suggest that the poor readers have been unable to make the link between print and sound due to a lack of phonological awareness. Alternatively, it may demonstrate that early links between letters and sounds are vital in order to develop phonological awareness as, once a phoneme is associated with its corresponding written symbol, it becomes more concrete and easier to isolate in a spoken word (Cronnell, 1978). The reasons that these associations were not made by the poor readers could be due to a variety of causes, both internal and external to the child, and therefore, comparisons between good and poor readers do not answer the 'chicken and egg' question. Nor do they unequivocally demonstrate a causal relationship.

Illiterate v. literate Portuguese.

Morais, Cary, Alegria, & Bertelson, (1979) found a group of illiterate people in an agricultural community in Portugal prior to a national literacy drive. They investigated the differences between this group and another group, who had had the opportunity to take advantage of an adult literacy programme, by comparing them on tasks that involved both phoneme and syllable manipulation with real words and non-words (i.e. deletion, addition and reversal). The illiterate group were most successful on the syllable task, with correct responses nearly half the time. However, the phoneme tasks were much more difficult for them. They were best at adding an initial phoneme to a real word (alhaco-palhaco) with a 46% success rate but compared with the literate group's 91% correct responses, the performance was very poor. The gap between the two groups was even wider for non-words with correct responses being 19% and 71% respectively. As far as phoneme reversal was concerned, the illiterate group were virtually unable to do the task. As the only reason this group was unable to read was simply that they had not been taught, it would be unreasonable to attribute their illiteracy to lack of phonological awareness as Bradley & Bryant (1978) had done with their group of poor readers. Morais (Morais, Cary, Alegria, & Bertelson, 1979; Morais, Alegria, & Content, 1987) concluded therefore, that *phonemic* awareness, unlike the *phonetic* awareness of speech segments such as syllables, did not arise developmentally in the absence of learning to read. As always there are difficulties comparing atypical groups and this one is no exception. The literate control group could have been different from the illiterate group in ways other than their ability to read due to the factors that enabled them to attend adult literacy classes. Although Morais tried to overcome this problem by finding two more comparable groups (Morais, Cluytens, Alegria & Content, 1986a), they ran into design problems. Not only did they use only nonsense words, which are more difficult for non-readers but in the deletion task, the phoneme to be deleted was always a consonant and the syllable to be deleted was always a vowel. However, the results remained the same with the illiterate group achieving only very low scores on the phoneme tasks, a little better on the syllable tasks but still far lower on both tasks than the control group.

Goswami & Bryant (1990) question the specificity of the claim for non-readers' insensitivity to phonemes when they also performed worse than the controls on the syllable task. As sensitivity to syllables has been shown to be independent of reading ability they propose that the non-readers' performance is an indication of some other significant factor such as motivation or IQ. An alternative view suggests that it may just be due to the fact that illiterate adults, for whom language is an over learned, automatic ability, have difficulty reflecting on aspects of spoken words other than their meaning. This possibility is supported by the difficulty they have with nonsense words. Pre-literate children who are still learning their native tongue may be more sensitive to aspects other than meaning, like awareness of the initial consonant due to articulatory cues from the mouth and tongue as they prepare to utter the first sound (see Lindamood & Lindamood, 1984). Syllable segments and rhyme awareness also may be more salient to young language learners than to mature language speakers, as they are actively developing and adjusting their vocabulary.

In a later study, (Morais, Content Bertelson, Cary & Kolinsky, 1988) Morais et al were able to improve illiterate people's phoneme awareness with instruction and feedback. The possibility of improving phoneme awareness in the absence of corresponding graphemes has been demonstrated with varying degrees of success, most often with initial phonemes, onset blends or rimes (Bentin & Leshem, 1993; Bradley & Bryant 1983; Byrne & Fielding-Barnsley, 1991; Cunningham, 1990; Fox & Routh, 1986; Lundberg, Frost, & Peterson, 1988; Naslund & Schneider, 1996; Torgesen, Morgan, & Davis, 1992). Although some success is claimed on very simple reading analogue tasks (Byrne & Fielding-Barnsley 1991; Torgesen, Morgan & Davis, 1992) this is not conclusive evidence that phonemic training alone bears any additional causal relationship to literacy acquisition. Neither is there any evidence that non-readers will develop awareness of phonemes without instruction, which is again what Morais (1991) found with a group of illiterate Portuguese poets who could not manipulate phonemes or categorise speech segments in spite of their highly developed linguistic ability to produce complex rhyming verses.

Chinese logographic script v. 'pinyin'.

Using exactly equivalent tests of phonemic ability (addition and deletion) as Morais et al (1979), another group of researchers (Read, Zhang, Nie, & Ding (1986) found support for the Portuguese studies. This time the experimental group could read their traditional logographic script, which represents whole words as a idiographs. Although there are some phonetic cues in idiographs, on the whole logographic readers do not have access to the phonemic structure that an alphabetic script represents. Another group of Chinese readers, who had learned to read with an alphabetic version of written Chinese called 'pinyin' acted as a comparison group. As expected, the 'pinyin' group outperformed the traditional logographic group who had great difficulty with the phoneme tasks, especially when they involved non-words.

Goswami & Bryant (1990) cast doubt on these findings as the traditional logographic group were older than the 'pinyin' group with a mean age of 49 years as opposed to 33 years for the pinyin group, and had 3 years less schooling (7 years & 10 years). Although an experimental design using different cohort groups can be problematical, criticism on the basis of school attendance some 28 years earlier is disingenuous as literacy is normally established within the first seven years of school and is likely to improve through reading experience throughout life. Also these results reinforced an earlier study with a similar Chinese group (Read, Zhang, Nie, & Ding, 1984) leading to the conclusion that it is not literacy in general that leads to (phonemic) segmentation skill, but alphabetic literacy in particular (Read et al, 1986).

Japanese 'kana' v. English alphabet.

Finally, Mann (1986) in the USA found that Japanese six year olds, who learn to read with a syllabic script called 'kana' also found a phoneme tapping task extremely difficult and were much worse at it than American 6 year olds. They were much the same as the American children, though, on a syllable counting task. Later on in their reading instruction, when the Japanese children's attention was drawn to the phonemes that differentiate the syllables they improved on the phoneme task.

Summary.

In summary, the studies examining the question of which comes first, phoneme awareness or the alphabetic principle, are not ideal due to the inevitable problems of comparing asymmetrical groups (Goswami & Bryant 1990; Wagner & Torgesen, 1987). None the less, they represent a body of evidence that demonstrates the extreme difficulty that individuals without alphabetic knowledge have in manipulating phonemes in spoken words. However, it must be pointed out that the phoneme addition and deletion tasks used by Morais and colleagues make quite heavy cognitive demands in addition to simply identifying a phoneme (Stuart, 1990). In the case of addition, for example, participants are required to pronounce a given word, with the addition of an extra phoneme at the beginning or the end that changes the word into a new word. In the case of deletion, participants need not only to identify and isolate the first or last phoneme in the word but are also required to pronounce the rest of the word once it is deleted. Therefore, these particular tasks may involve orthographic strategies not available to the non-alphabetic readers. They may, for instance, have been able to identify an initial phoneme, although as Mann (1986) found, the straight-forward task of tapping out the number of phonemes within a word was extremely difficult for non-alphabetic readers. These studies taken together, therefore, support Morais et al's (1979) claim that literacy acquisition plays a causal role in the development of awareness of phonemes in speech and Read et al's (1986) claim that it is not just literacy acquisition in general but alphabetic literacy in particular that enables phonemic segmentation. This view proposes therefore, that the alphabetic principle does largely come before phoneme awareness.

Goswami & Bryant (1990) agree in general with these conclusions but they cast the evidence in a different light. They strongly believe that general phonological awareness prior to reading development plays a causal role in literacy skill, as they perceive that children lacking rhyme and alliteration skills fare worse in reading acquisition. They therefore propose that it is possible to facilitate phoneme awareness in ways other than, and prior to, formal reading instruction, e.g. by training in rhyme and alliteration.

It could be argued, however, that if the goal is to bring phoneme awareness to children why give them the unnatural and difficult task of identifying phonemes in spoken words without the concrete representation of their written counterpart? A distinct visual symbol for each phoneme may anchor the phonemes perceptually (Adams, Treiman, & Pressley, 1998).

If phoneme awareness developed naturally in the linguistic system, it is likely that the alphabetic principle would have been devised a lot earlier than a mere 3000 years ago. The difficulty that illiterate people have in identifying phonemes in their language highlights the extraordinary feat undertaken by the ancient Greeks in mapping, for the first time, the phonemes of their language onto symbols. The powerful tool they handed down through history offers easy identification of the phonemes in a language.

It is the ability to manipulate this tool prior to reading development that is the focus of this study.

It is therefore incumbent on those who propose a causal role for phonological awareness alone, without the introduction of the alphabetic principle, to provide empirical evidence in support of their claim.

2. Is there a causal connection between PA and literacy acquisition?

Overview.

The optimum approach to investigating the causal role of PA in literacy acquisition is to manipulate PA skill through a training programme, measuring the effects of training on later reading ability, for various experimental conditions, compared with an untrained condition. Throughout the 1980's and 1990's numerous research studies of this kind were carried out with the overwhelming conclusion that not only can PA be improved by training but also that improved PA leads to enhanced reading ability.

However, these studies vary widely in their internal and external validity, use inconsistent terminology (phonological and phonemic awareness used interchangeably) and diverse independent variables, making it difficult to make direct comparisons or generalisations to a larger population (Bus & Ijzendoorn, 1999, Troia, 1999; Wagner & Torgesen, 1987).

Methodological Quality.

Thirty-nine intervention studies carried out between 1974 and 1996 were selected for methodological examination by Troia (1999) and demonstrate the diversity of every aspect of the corpus of PA studies. Twenty-two were conducted in the USA and the rest were carried out in Canada, Portugal, Israel, Australia, New Zealand, Belgium, the UK, or Scandinavia. The children were between the ages of 4 years and 7 years in 3 of the studies and matched for reading age in the studies whose participants had reading disabilities. The number of treatment sessions varied from 5 (Slocum, O'Conner, & Jenkins, 1993) to 100 (Lundberg et al., 1988; McGuinness, McGuinness, & Donohue, 1995) with an average of about 35. The length of intervention varied greatly from 2 weeks

(Content, Morais, Alegria, & Bertelson, 1982; Hohn & Ehri, 1983; Vellutino & Scanlon, 1987) to 2 years (Bradley & Bryant, 1983) averaging approximately 11 weeks. Over 10 of the studies were longitudinal in design, 12 evaluated classroom intervention programs and 3 studies used computer-based instruction. All but 2 of the studies (Bradley & Bryant, 1983; Haddock, 1976) included a phoneme analysis or synthesis task as a criterion measure. All but 9 of the studies included an evaluation of reading achievement and an experimental decoding test or reading analogue task and half the studies assessed the effects on spelling performance. Only 13 of the studies took baseline measures that identified their participants as non-readers.

The most serious methodological shortcomings identified by Troia were

- Non-random assignment of participants to treatment groups.
- Failure to control for Hawthorne effects by providing alternate interventions to control groups.
- Insufficient or non-existent assurance of fidelity of treatment.
- Poor measurement of sensitivity.
- Inadequately described samples.

Flaws not considered serious enough to render findings uninterpretable or externally invalid were noted in the majority of studies and included

- Differential exposure of groups to treatment materials.
- Confounding of instructors and conditions.
- Lack of criterion based instruction.
- Unreported or non-existent reliability data for dependent measures.
- Use of inappropriate units of analysis.
- Neglect of stimulus transfer concerns.
- Failure to assess maintenance effects.

Only 7 (18%) met at least two thirds of the combined internal and external validity evaluative criteria, though all of these contained between one and three fatal flaws (e.g. insufficient evidence of treatment fidelity).

Troia points out that none of the studies evaluated the effects of classroom-based intervention so there is a lack of evidence that PA treatment programs are ecologically valid and effective in classroom environments. He suggests the possibility that such programs may be impractical or too complex for implementation in the classroom and that the positive effects observed by researchers would be compromised in classroom practice.

Conclusion.

In conclusion, Troia accepts that the 7 best studies do support the hypothesis that metaphonological training can improve both 'analytic and synthetic' (segmenting and blending) PA skills and literacy acquisition (at least basic reading skills, cf. Uhry & Shepherd, 1993) in as little as 2 months of small-group or individual instruction (sessions often are of 15-20 minutes duration and usually are provided twice per week). However, he suggests that classroom research is that which is most needed to inform and improve educational practices (Howe & Eisenhart, 1990; Snow, 1974). The present study is intended to address this need.

Troia's comprehensive assessment of the methodological quality of the most prominent published PA studies does not, however, distinguish between the studies looking at the impact of implicit, naturally developing phonological awareness on literacy such as rhyme, and studies concerned with phoneme awareness which is more closely associated with written language. Nor is the distinction made between studies examining the role of exclusively oral language training and those that include the corresponding letters.

Diversity of PA Studies.

A meta-analysis of an overlapping group of studies was carried out by Bus & Ijzendoorn, (1999) who teased out the different aspects of PA. They cite Elbro (1996) who suggests that PA is the single strongest predictor of reading development in both childhood and adulthood and conversely Ehri (1979) who proposes the possibility that PA maybe an outcome of learning to read.

They acknowledge the diversity of PA studies and the difficulty of making comparisons, and therefore suggest that differences between training programs may be related to differential effects on reading.

They found that programs that combine phonological training with written letters or words may be more effective than purely phonetic programs and that starting earlier may be more effective than starting later in childhood. They also posit the view that shorter programs may be less effective than programs with a longer duration.

However, the major difference between PA studies, Bus and Ijzendoorn suggest, consists of the presence or absence of a linkage with letters or written words.

For example, Lundberg, Frost, and Petersen (1988) and related programs, that use a variety of rhyming and segmenting games over a period of several months, do not provide children with an explicit conceptual connection between the phonological skill and decoding or reading. At no time during the training sessions are participants exposed to letters or words in print. Cunningham (1990) did provide an explicit conceptual connection between phonology and reading for one of her groups but not for another in an attempt to evaluate the independent contributions of implicit and explicit PA. Both groups segmented and blended words into syllables and phonemes but the explicit group practised with words in their reading books but without the printed words or letters present. Byrne & Fielding-Barnsley (1991) have a letter present but not prominent while children identify items in a picture that start or end with the target phoneme. Inspired by the original ideas of Elkonin, (1973) Ball and Blachman (1991) made the role of segmentation in an alphabetic system more explicit. Children moved blank counters to correspond with the number of phonemes heard in a word. One blank tile per word would then be replaced by a letter tile, with a maximum of two letters introduced per session. Bryant & Bradley (1985) used CVC words to relate the sounds in words to their spelling patterns, demonstrating how words that have sounds in common also (may) have clusters of letters in common. Changing a word from *cat* to *hat*, removes the onset /c/ and replaces it with the phoneme /h/, leaving a rhyming sound /at/ intact thus helping children to associate a word's sounds with its visual appearance. Other programs connect the phonological processing directly to reading. Vandervelden and Siegel (1997) get children to identify the initial phoneme in a word and then find the target letter in a set of plastic letters. The children subsequently identify words on the basis of their initial consonants, for example, by choosing which one of two word cards represents *friend* and which one represents *kiss*. Finally, other programs, (e.g. Williams, 1989) introduce all the letters that correspond with the phonemes, but only after children have practised orally, both segmenting words into phonemes and blending phonemes into syllables and words.

Analysis of Studies.

Given this range of independent variables that come under the general heading of PA and upon which it is proposed reading skill depends, it is important to identify exactly which variables are likely to facilitate reading acquisition and have the largest long-term effects on various aspects of reading skill.

Bus and Ijzendoorn therefore review 51 studies in order to test the following hypotheses:

- Training PA affects learning to read processes in a positive and substantial way.
- Phonological training is more effective when the program combines phonological training with written letters or words.
- Starting early with phonological training is more effective than starting later in childhood.

Overall, Bus and Ijzendoorn found that PA training improved the children's PA and, but to a lesser extent, their reading skills as well. They concluded that their meta-analysis of two homogeneous sub-sets of American studies with randomised or matched designs settled the issue of the causal role of PA in learning to read. However, these studies also demonstrated that phonemic awareness with letter training strongly affected PA, so as Ehri (1979) suggested, PA might also be considered an outcome of learning to read to write. Bus and Ijzendoorn therefore tentatively propose that "Reciprocal causality may be a likely model in complex educational processes such as learning to read".

Bus and Ijzendoorn disagree with Elbro's (1996) proposal that PA is the *single* strongest predictor. Although in this study they found that PA accounts for 12% of the variance in reading skills, in a previous meta-analysis, they found that early storybook reading was also a strong predictor, explaining about 8% of variance in children's literacy skills (1995). But they agree with Lundberg (1988) that the onset of preventive interventions in early childhood seems to be 'never too early'. Although they were not specific, their meta-analyses showed that an early start with phonological training tends to facilitate the process of learning to read. In addition to an early start, Bus and Ijzendoorn conclude that gains are more consistent and robust when PA has been trained together with letter-sound correspondences. Both of these suggested advantages are integral to the intended 12-week study for this thesis. Their suggestion that shorter training may be less effective than longer training is not assessed in the work to be presented here.

Long-term gains were greater for PA and spelling than word recognition, but this may simply reflect ceiling effects. An alternative explanation could be as Share (1995) suggested, "that PA may facilitate the process of learning to read but not necessarily the outcomes of the learning process" However, at the end of this fairly exhaustive appraisal of the diverse aspects of PA, there is still no unambiguous support for the causal role of purely phonemic awareness, developing either naturally or as the result of training.

A More Detailed Appraisal.

In order to examine more closely the effect of the purely oral PA studies that feature in the critiques of Troia (1999) who was concerned with methodological rigor and Bus and Ijzendoorn (1999) who focused on differential investigations of the various aspects of PA, six seminal PA studies will be reviewed in detail. These will include examples of longitudinal correlational studies investigating a causal role for PA (Lundberg et al 1980; Bradley and Bryant, 1983); PA training studies with analysis of spelling patterns that find enhanced results with letters included (Bradley & Bryant, 1985; Blachman, 1989); and training studies that attempt to isolate the purely phonemic contribution of PA (Cunningham, 1990) but have some alphabetic letters present (Byrne & Fielding-Barnsley, 1991a). These studies demonstrate the difficulty of isolating a single causal factor that affects literacy acquisition.

Review of Key Seminal Studies that Focus on the Role of PA in the absence of alphabetic letters.

A Longitudinal Correlational Study, Sweden. (Lundberg,Olofsson,& Wall,1980).

One of the first large scale longitudinal correlational studies investigating the causal role of PA was carried out by Lundberg, Olofsson, & Wall (1980), in Sweden. Their participants were 143 kindergarteners whose age was 7 years. Due to the fact that formal schooling starts in Sweden at this age, these children were equivalent in amount of schooling but far more mature than most kindergarteners in other countries. The interesting aspect of this study is that Lundberg et al used a range of tasks as an initial measure of PA and analysed their contributions to reading separately. Tasks included segmenting and blending syllables and phonemes; determining whether a target phoneme is in the initial, medial, or final position in a spoken word; reversing phonemes; and rhyme.

The only measures of PA that were reliable determinants of first grade reading achievement independent of general cognitive ability, were skill at reversing the order of phonemes (path coefficient .56) and to lesser degree, skill at producing rhymes (.19). However, the observed relations between kindergarten PA and first grade reading may depend on pre-existing reading skill. The fact that at the pre-school stage, some of these children were able to perform well on a phoneme reversal task, casts doubt on their pre-literate status, as Morais et al (1979) found that even identifying phonemes was extremely difficult and reversing phonemes was almost impossible for non-readers. The possibility that some of the children could already read is borne out by their performance on the reading screening measure given at the beginning of the study that was also related to first-grade reading achievement. If none of the children could read, there would be no variance in this variable and thus it could not be related to any other variable.

Wagner & Torgesen (1987) noted this anomaly and calculated partial correlation coefficients between the kindergarten phonological awareness measures and first-grade reading with the score on the kindergarten screening test of reading held constant. The results were striking. Instead of the significant result of the simple correlations between PA and first-grade reading (with a median of .45) there was a non-significant result of the partial correlations, with a median of .06 once the kindergarten reading measure was held constant.

Wagner & Torgesen (1987) concluded that, "differences in original level of reading proficiency could have been responsible for the observed relations between kindergarten phonological awareness and first-grade reading achievement, thus making ambiguous the causal implications of these data."

The same conclusion has to be drawn for a similar study by Stanovich, Cunningham, and Cramer (1984) that correlated 10 PA tasks in kindergarten with the same measures taken 1 year later. It was impossible to determine from the data presented whether these relations were independent of pre-existing differences in reading skill.

A Longitudinal Correlational Study, Britain. (Bradley & Bryant, 1983).

In 1983 Bradley & Bryant reported a correlational study examining the relations between phonological awareness and reading. Embedded within the correlational study was a large scale, 3 year, longitudinal experimental study, that Bradley & Bryant (1985) claimed established the *causal* connection between phonological awareness and reading for first time.

The participants in the original study (1983) were 368 four to five year olds who were selected on the basis of being non-readers, although no information is given as to how reading ability was assessed. Sound categorization scores measuring phonological awareness were derived from a test in which 4 year-old participants had to detect the 'odd one' out of 3 words that shared a common phoneme (for the five year-olds, the set size was increased to 4 words). The common phoneme was either at the beginning, the middle or the end of the word, (*hill* **pig pin**), (**cot pot** *hat*) (*doll* **hop top**). (The younger children were only given 3 words as it was considered that four would be too much of a memory load). They were all given a memory span task which involved repeating the same list of words in order, and the English Peabody Picture Vocabulary Test as a measure of IQ.

At the end of the correlational study, 2 years later, two standardised tests of reading and a spelling test were administered as well as the original sound categorisation test. A different intelligence test was administered, the Wechsler Intelligence Scale for Children (Wechsler, 1974) and a whole class mathematics test, to control for the specificity of the results.

Wagner & Torgesen (1987) re-evaluated the data from this study and found that sound categorisation uniquely accounted for between 4% and 10% of the variance in reading, 6-8% of the variance in spelling, and 1-4% of the variance in the maths scores. With the exception of the lower value of the percentage of variance accounted for in maths scores, the contributions of the sound categorisation score were significant at the .001 level, although most of the variance for the literacy measures was due to factors other than the sound categorisation scores, such as IQ and educational history. Nonetheless, Wagner & Torgesen point out that, "it is important to note that phonological awareness as measured by Bradley and Bryant was responsible for between 4% and 10% of the variance in reading and spelling achievement".

On the negative side, Wagner & Torgesen (1987) suggest that the sound categorisation task may have been a better measure of working memory than of phonological awareness. In order to find the 'odd one out' of a list of words, the word list has to be held in memory while the analysis task is performed. The memory component may be the reason that the contribution of the sound categorisation score was highly significant for the upper value of the percentage of variance accounted for in the maths score.

Summary.

All the studies carried out to this point in time were correlational and the results remained ambiguous; however, Lundberg et al (1980) and Bradley and Bryant's(1983) longitudinal studies were a design improvement. If the children had genuinely been non-readers at the start it could not be concluded that reading influenced early differences in PA and therefore the direction of causality could not be from reading to PA. On the other hand, if individual differences in PA at the start correlated with later reading outcomes it would not necessarily lead to the conclusion that the direction of causality leads from PA to reading. There may have been some other factor that contributed, both to the early PA and the later reading, such as memory or IQ.

So Bradley and Bryant (1983) proposed that if children's phonological awareness was improved with training, and if this led to higher scores on a reading test compared with a control group, a causal role for phonological awareness in relation to reading would be supported.

PA Through Analysis of Spelling Patterns. (Bradley and Bryant, 1985).

To put this theory to the test, Bradley & Bryant (1983) selected sixty-five children (whose sound categorization scores were at least two standard deviations below the mean), as an experimental group from the 368 four to five year old subjects in the much larger correlational study. They then divided the experimental group into 4 smaller groups, matched for age, verbal intelligence and original sound categorization scores. There were two experimental groups with 13 children in each, and two control groups, one with 26 children and the other with 13. (This was a surprisingly small number of participants for such a seminal study.) The two experimental groups, group 1 and group 11 then received intensive training in categorizing sounds, involving 40 individual sessions over 2 years. They were taught that the same word, represented by a picture, could share common sounds with other words, either at the beginning (**h**en, **h**at), middle (h**e**n, p**e**t) or end (he**n**, ma**n**).

In addition, experimental group 11 were taught how letters of the alphabet could represent these sounds. Control group 111, in the same number of sessions and with the same pictures that were used in both the experimental groups, was taught to categorize the items into conceptual categories e.g. farm animals and control group 1V received no training at all.

Summary of Results.

In summary, only the group with training in letter-sound knowledge as well as sound categorisation was significantly ahead of the control groups and also significantly ahead of the 'sound categorisation only' group on spelling measures. From this result one can conclude that instruction in the correspondence between letters and the sounds they represent is vital to literacy acquisition. It must also be noted that the 13 children who achieved the significantly higher results were trained individually in 40 sessions over 2 years. This raises the question, could similar results be achieved through instruction in letter-sound correspondences at a whole class level, and in a shorter time span? It is unclear how many phonemes or letters were introduced: were the 26 letters of the alphabet covered by the sets of training words, or did these cover all the 40+ phonemes in the English language? It is clear that the phonemes and letters were not taught in isolation, only in the context of common units in words. Would there have been a different effect of phonological awareness on reading if all the sounds had been taught in isolation first, followed by segmentation and blending practice, tasks more closely associated with decoding than tasks that involved simply identifying the common phonemes shared with other words (Lewkowicz, 1980)?

The 'sound categorisation only' children also were trained individually in 40 sessions over 2 years and, presumably, were at the same time learning about the alphabet in the normal course of their schooling, so connections could have been made in a less intensive way, leading to less optimal achievement. So, a further conclusion could be drawn that even for this group it may have been explicit instruction in linking the letter with its corresponding sound that made the difference to literacy acquisition.

Bradley and Bryant's (1985) conclusion, however, was somewhat different. They concluded that the results of this study supported the overall conclusion of their longitudinal, correlational study. That is, the results provided "strong support for the hypothesis that the awareness of rhyme and alliteration which children acquire before they go to school, possibly as a result of their experiences at home, has a powerful influence on their eventual success in learning to read and to spell" (Bradley and Bryant, 1983). Further, they suggested that the results of the experimental training study demonstrated, for the first time, that the role played by awareness of rhyme and alliteration in its association with reading, was a causal one.

Wagner & Torgesen (1987) would like to have seen a 'letters only' condition included in the Bradley & Bryant's (1983) study, but as mentioned, it seems likely that the 'sound categorisation only' children were interacting with letters on some level in their normal schooling and that had had no significant effect in the control group.

Including a Letters Only Condition. (Blachman, 1989).

Wagner & Torgesen's ideal was realised by Blachman (1989) who replicated Bradley & Bryant's (1985) study and included a 'letters only' condition. This condition did not lead to any advantage in subsequent reading abilities. Blachman was able to confirm the conclusions of other studies involving letter-sound training, (Torneus, 1984; Williams, 1980) that the inclusion of letters in any phonological awareness programme is critical to the improvement of literacy skill (Gough & Hillinger, 1980).

In summary, this study demonstrated that training in alphabetic letters alone is not enough, nor is it enough to train children in PA alone; both are needed as a foundation for skilled reading. It is the combination of the two that could contribute to developing and structuring linguistic codes for lexical access (Frost, 1998; Share, 1995).

A phonetic training study for implicit and explicit PA. (Cunningham, 1990).

Morais, Alegria, and Content (1987) posed the question "......whether it is necessary for or at least beneficial to the acquisition of reading and writing in the alphabetic system, to be trained previously on segmental analysis of speech." (p.63). Elkonin (1963) for example, trained children to place counters on a board for the number of phonemes in a word prior to replacing the counters with the appropriate corresponding letters. It is proposed that this could refine the implicit awareness of speech sounds such as syllables and rhyme that develops naturally, to an explicit awareness of phonemes and how they can be mapped onto the letters for written language.

Cunningham (1990) took up the challenge to investigate this question by isolating and evaluating the independent contributions to reading of what she called implicit phoneme awareness compared with explicit phoneme awareness. She proposed that the type of instruction may make a difference as to how the analysis of speech can be transferred to the reading situation. She suggested that it is reasonable to expect that providing children with a metalevel framework of how language can be examined independently of meaning, how segmentation and blending are involved in decoding, why it is helpful to employ these skills, and when segmentation and blending of phonemes should be utilised should affect the broad transfer of phonemic awareness to reading.

The study.

The participants for Cunningham's (1990) study were 'pre-reading' children (mean age of 5yrs 11mths) and beginning readers (mean age 7yrs 2mths) who were randomly assigned to one of three groups. The first experimental condition involved teaching children segmenting and blending words, syllables and phonemes (skill & drill) using wooden chips to represent each sound as letter-sound correspondences were specifically not included in either experimental condition. One-syllable words and pseudowords were segmented with a limited number and circumscribed set of phonemes. The second experimental condition (metalevel), involved the same phonemic awareness training but with explicit discussion of the goals and purposes of learning phonemic awareness. For example, reflecting on the words in their reading books and imagining cutting them up into sounds or asking the child if /b/ /a/ /t/ fitted into the story they were reading about a baseball player. The third group acted as a control, listening to, and discussing likes and dislikes of a story.

Training ran for 15 to 20 minutes, twice a week for 10 weeks (a total of about 6 hours) in small groups of 3 or 4 children.

Achievement and aptitude tests of reading and school ability were carried out as well as three phoneme awareness tests. The phoneme awareness tests were as follows;

Outcome for Phoneme Awareness.

Although the first grade students performed significantly better than the kindergarten aged children on the phonemic measures, the only effect of treatment was for the meta-level kindergarten group. However, closer inspection of the means displays ceiling effects for the first-grade groups on these tasks, precluding the possibility of variation between the groups. Interestingly, the experimental kindergarten group's scores after training were markedly better on all the phonemic awareness tasks than the first-grade control scores taken simultaneously. This suggests that instruction may be more critical for the development of phonemic awareness than a child's developmental level.

Outcome for Reading.

Training in phonemic awareness significantly enhanced reading performance for both kindergarten and first-grade experimental groups over the controls.

The only significant difference of type of phonemic training on reading achievement however, was for the older children in the metalevel group, who were significantly better than the 'phonemic awareness only' (skill & drill) group and controls. However, the standard deviation for this group was much higher than for the other groups, implying a wider variation in the children's ability to take advantage of the training. Nevertheless, this study demonstrates that reading instruction that includes explicit instruction in segmenting and blending phonemes as well as generally reflecting on their correspondences with the units in written words has a significant advantage for literacy acquisition over reading instruction that does not make the connection explicit.

Cunningham suggests that the lack of effect of type of instruction for the younger children in the meta-level group may be due to fact that the younger children (unlike the older children) were not concurrently involved in a formal reading program. Therefore, they did not have the same opportunities to utilise and apply their new knowledge to reading.

The Relation between Phonemic Awareness and Reading Achievement.

Although the younger children were classified as pre-readers, all three groups had achieved a scaled score in the 120's on the Metropolitan Reading Achievement Test. The relationship among the variables was explored with a series of hierarchical multiple regression analyses, with the pre-test reading ability scores, phoneme awareness scores and IQ as predictor variables and post-test reading achievement scores as the criterion variable. The pre-test scores on the Reading Achievement Test accounted for 32% of the variance in predicting post-test Reading Achievement Test scores for kindergarten and 40% for first grade. The IQ measure of global ability accounted for an additional 10% for kindergarten and 9% for first-grade. The phonemic awareness measures accounted for significant variance above and beyond that due to reading i.e. 14% for Lindamood auditory conceptualisation (which includes phoneme counting), 3% for the Bradley and Bryant oddity test and 3% for the phoneme deletion task. Cunningham (1990) claims that this additional contribution demonstrates that phonemic awareness is more than simply a sub-skill or component of reading; however an examination of the phonemic measures used may indicate otherwise. As discussed earlier, both phoneme deletion and phoneme counting generally require some alphabetic or letter-sound knowledge (Morais, et al 1979; Read et al, 1986), as a phoneme is purely an abstract concept. Therefore, pre-test ability on these tasks may simply reflect varying levels of developing phoneme awareness due to initial letter-sound knowledge or reading ability. Unfortunately, the data for specific letter-sound knowledge and word recognition is obscured in the standardised reading ability test scores.

When the phonemic awareness measures were entered first in hierarchical multiple regression analyses, they accounted for over half the variance in the children's reading achievement in the spring, i.e. regardless of treatment group, 60% of the variance in the combined scores of all three groups of younger children and 51% in the combined scores of all three groups of older children. Combining the pre-test phonemic awareness scores of all the children including the controls and comparing them to the combined post-test scores of reading achievement, obscures the effect of the training. Both control groups average gain scores were lower both on the phoneme tasks and reading. This would seem to imply that the advantage found for the meta-level first-grade experimental group was due, not to initial superior phoneme awareness skill, but to training in what are essentially basic literacy skills i.e. segmenting and blending the features within words (Lewkowicz, 1980). Although the link between the sounds and letters was specifically withheld, the children's attention was directed to specific words they were learning to read in their story books and they may have been advanced enough in their reading ability to make the letter-sound connection for themselves. This may have advantaged children with average ability in this group thus raising the overall mean score. In fact, the experimental children reported that when they were in their reading groups or reading silently alone, they reflected upon the knowledge gained in their experimental groups.

This study gives strong support to the hypothesis that children can acquire phonemic awareness through direct instruction and that this can significantly improve their reading performance. The effect is even stronger when phonemic awareness is combined with written language knowledge. This answers part of Morais et al (1987) question in that training on analysis of speech is indeed beneficial to the acquisition of reading in the alphabetic system. However, it does not answer the question as to whether it is necessary (or even optimal) to train children to analyse speech into phonemes in the absence of the symbol for which the concept of a phoneme was conceived to define.

It would have been interesting had Cunningham included a third experimental condition that explicitly linked phoneme awareness with the corresponding graphemes, to ascertain whether explicit correspondence between letter-sounds made a significant difference over and above meta-level phoneme awareness.

Conclusions.

In conclusion, Cunningham admits that the younger children were less able to use their new knowledge for reading, as they were not engaged in a reading programme. This therefore indicates that, although it is beneficial, it is sub-optimal to introduce blending and segmenting techniques in the absence of letter-sound or reading instruction. Even though the phonemic awareness scores of the kindergarten group were higher after training than the scores of the untrained first-grade group, it is possible that by including letters in the phonemic awareness training, learning to segment and blend phonemes may have been easier. The transfer of knowledge to a reading situation may also have been more obvious.

The participants in Cunningham's study were trained in small groups of 3 or 4, which is preferable to individual training but more costly and time consuming than training on a whole class level. It is unclear how many phonemes were included in the experimental conditions as they are described as a limited number and a circumscribed set.

Sound Categorisation with the Letter Present but Incidental.

(Byrne & Fielding-Barnsley, 1987).

Brian Byrne (1987) in Australia felt one must not prematurely dismiss the importance of phoneme awareness as a necessary prerequisite for gaining initial access to the alphabetic principle. Byrne and Fielding-Barnsley acknowledge the incongruity of contemplating a role for innate factors in the development of reading and spelling, as written language is, after all, a cultural invention and not part of our species-specific biological endowment (1995). However, they suggest there may be a general learning mechanism that is brought to bear on reading acquisition. They cite Ferreiro's (1986) findings that children's hunches about written language are meaning orientated but point out that what children need to know is that primarily print maps onto the sound system. However, in a series of studies they found that children did not spontaneously learn about the sound value of letters when they learnt to recognise words as wholes. Seymour and Elder's (1986) evidence, from a year long observation of a Scottish Grade 1 class, supports Byrne and Fielding-Barnsley's conclusion. The Scottish children taught with a method that avoided direct instruction in letter-sound relationships and decoding processes could by and large read only a very few words that they had not been taught. Byrne and Fielding-Barnsley therefore suggested that more research was necessary.

The Intervention Study.

To this end, Byrne & Fielding-Barnsley, (1991a) developed a programme entitled 'Sound Foundations' to focus on sound to word matching, by teaching children that different words can begin or end with the same sound. Large coloured posters were used depicting scenes with objects beginning with the same phoneme (sun, seal, sailor, sand, etc.) and others with objects ending with the same phoneme (bus, house, octopus, dress, etc.). They trained 64 pre-school children in small groups of 4 to 6 for approximately half an hour a week for 12 weeks (total 6 hours) to classify the items in the training materials on the basis of their shared sounds. A total of 6 phonemes were introduced, the consonants /sh/, /l/, /m/, /p/, /t/, and vowel /a/ as in <u>a</u>mbulance. Throughout the training, the letter representing the current phoneme was displayed, with the experimenter pointing out that the letter said the sound. Included in the training materials were card games, dominoes, worksheets, and songs and rhymes. There was a matched control group who learnt to categorise the items in the posters on a semantic basis.

Byrne and Fielding-Barnsley suggest that the letter supporting the phoneme under instruction was 'only incidental' in spite of the fact that the teacher explained that it represented the sound and it was always displayed as the children actively searched for items beginning or ending with the sound. It is possible that they underestimated its value to the children and although there is no mention of concurrent classroom teaching, it is possible that the children may have been exposed to some alphabetic instruction in their pre-schools. At the end of the training programme the experimental children were ahead of the control children on phonemic awareness and their improvement even extended to sounds that were not part of the training programme. They also performed better on a forced-choice, printed word task. This task involved the child choosing whether the displayed word *sat*, said *sat* or *mat*. In order to perform this task children must have made the connection between the initial sounds and their corresponding letters. A year later, at the end of the first year in school, the experimental group were significantly ahead on pseudo word decoding but not real word identification, comprehension or spelling Byrne & Fielding-Barnsley (1993a). This was an important finding, because the ability to decode pseudo words demonstrates that the regular phonic basis of reading has been mastered and it is at this level that reading disabled children stick (Stott, 1964). Children who have well-developed decoding skills may be more independent readers and therefore read more, gaining the advantages that reading experience brings (Cunningham & Stanovich, 1991). This advantage was manifest at the end of the children's second year in school when the experimental group had significantly higher scores on a more advanced pseudo word reading test designed to detect whether children are reading by analogy with real words in their reading vocabulary. This pseudo word decoding test (Coltheart & Leahy,1992) contained pseudo words like 'dalk' containing an orthographic rime that is pronounced in an 'irregular' but consistent way when it appears in real words like 'chalk'. Byrne & Fielding-Barnsley reasoned that "any tendency on the part of children to generate these irregular consistent pronunciations would be evidence that they had begun to acquire integrated orthographic units at the level of the rime, a further sign of reading maturity". However, it is not clear if any tendency to generate irregular consistent pronunciations was found. There was still no significant effect for the experimental group on real regular or irregular word reading or comprehension.

Reclassification of the data.

However, Byrne & Fielding-Barnsley reclassified the 125 children in the study, into those who had passed a phonemic awareness test at the end of pre-school and those who had not, regardless of training. There is no mention of how the non-experimental group had learned about phonemic awareness or if it was taught in the pre-school setting. They found that the children with pre-school phonemic awareness were ahead on all three of their literacy measures at the end of the first year. Byrne & Fielding-Barnsley claim support from this data for the causal role of phonemic awareness for the acquisition of literacy. Undoubtedly, drawing pre-school children's attention to the sounds in words has a beneficial effect for reading but Byrne & Fielding-Barnsley agreed with others that it is not sufficient for an effective decoding strategy (Brady et al, 1994; Bradley & Bryant, 1993; Lundberg, Frost & Petersen, 1988; Tunmer, Herriman & Nesdale, 1988). They acknowledge that out of the 125 children in both conditions of their study, 39 children passed their reading analogue task and these children were very secure in both phoneme identity and letter knowledge. In a follow up study Byrne & Fielding-Barnsley (1995) trained the regular classroom teachers to deliver the Sound Foundation Program. This resulted in a rather haphazard mode of delivery and less promising results. They concluded that the difference between the experimental and classroom groups was due to 'intensity of training'.

Summary.

In summary, Byrne & Fielding-Barnsley's (1991a) training programme ran for the same number of hours as Cunningham's (1990) study over a slightly longer period, 12 weeks, in similar small groups. This time span was much shorter than Bradley and Bryant's (1985), intervention study, that ran for 2 years and on an individual basis. It is evident from the pseudo word decoding advantage for the experimental group that the phonic basis of reading is firmly in place, thus providing a framework for a self-teaching mechanism (Share 1995). However, as with Bradley & Bryant (1983), they did not include the most salient phoneme awareness skills in their training, segmenting and blending. Also, although the children were able to generalise their phoneme awareness to untaught sounds they were only trained with a total of 6 phonemes with the corresponding letter present. Thus, they failed to maximise the advantage of training with letter-sounds and yet confounded their study of pure phoneme awareness by presenting the corresponding letter.

The intended study for this thesis will be carried out in the whole class setting of kindergarten children with an average age of 4 years. It will include all 40+ grapheme-phoneme correspondences as well as blending and segmenting techniques. The link with literacy will be made through modelling, with the children's participation, how phonemes blended into words can make 'stories'. The training is intended to take place for 5 to 10 minutes every day over a period of 12 weeks (total 7.5 hours).

Final Conclusions.

Research focusing on PA as the cognitive skill that underpins literacy acquisition has demonstrated that this focus is justified (Cataldo & Ellis, 1988; Ellis & Large, 1988; Juel, 1988; Juel, Griffith & Gough, 1986; Perfetti, Beck, & Hughes, 1987; Tunmer, Herriman, & Nesdale, 1988; Torgeson, Wagner, & Rashotte, 1997; Stanovich, 1986; Share & Stanovich, 1995; Stuart & Coltheart, 1988; Treiman & Zukowski, 1991). No study, however, has conclusively and unambiguously demonstrated that the naturally developing phonological awareness that children bring to the task of reading in the complete absence of alphabetic knowledge or familiarity with print, plays a causal role in reading development (Share, 1995). This does not preclude the possibility that a developmental delay or deficit in phonological processing could lead to reading failure (Goswami & Bryant 1990).

Ehri (1979) cautioned that careful evaluation of causal relations between phonological processing and the acquisition of reading skills is especially important because the development of many cognitive skills and the acquisition of reading usually proceed hand in hand. As soon as children have developed to a stage where they are able to score on tasks of metaphonological awareness, especially at the level of a phoneme, they are likely to be involved in pre-school activities that include letter-sounds, typically, the initial letter-sound of their own and their friend's names. Therefore, initial measures of PA are confounded as they simply may reflect the child's developing knowledge of alphabetic letters. Undoubtedly, training in phonemic awareness in the course of literacy instruction makes a significant difference to reading development. But if the purpose of the phoneme awareness training is to enhance children's literacy skill, it seems to be sub-optimal to learn about phonemes, which were originally isolated and identified in the speech stream in order that they could be represented by a letter in written language, without the letter present.

3. What level of PA facilitates word recognition?

As mentioned earlier, a major debate developed in the literature from the early 1980's regarding the level of PA necessary to facilitate word recognition. Treiman (1983, 1985) identified the intra-syllabic units of onset and rime as having a special psychological status for both adults and children. Goswami (1990a) incorporated these units into her analogy model of reading acquisition, which contrasted with the alternative focus on phoneme awareness as the basis of literacy development.

Influenced by Bradley and Bryant's (1985) study that claimed a causal connection between PA and reading skill, Goswami developed a highly plausible argument for lexical analogy as a mechanism for reading development. As Goswami's theory has had such a profound effect on the psychological approach to reading development as well as influencing education in England and Wales, especially at the Reception level (NLS, 1998), it will be outlined in detail before some of the counter arguments are reviewed. Studies investigating the causal role of the alternative level of PA, that focus on gpc's as a foundation for literacy development, will then be reviewed.

A Theory of Reading Development as a Process of Lexical Analogy with a Basis of Onset and Rime. (Usha Goswami, From the mid-1980's onwards).

Overview of the Theory

Reading development can be seen as an increasingly refined process of lexical analogy. Children initially set up recognition units for words that are coded in terms of two phonological units, the onset and the rime. As reading develops, and spelling is taught, a more fine-grained phonological analysis becomes possible, and children begin coding graphemes in terms of phonemes. Thus, reading is an interactive, developmental process in which a child's knowledge about orthography is affected by, and in turn changes, that child's phonological knowledge (Goswami, 1992).

Development of Theory.

Goswami's theory of reading development was derived from an analogy model of skilled reading (Glushko, 1979) which challenged the traditional 'dual-route' theory. In the dual-route theory word recognition depends on either a direct (lexical) route to a hypothesised mental lexicon where the word would be recognised instantly as a whole, or an indirect (sub-lexical) route where the sub-word units must be assembled and pronounced before the meaning can be retrieved. Whereas, the analogy model proposes that children used orthographic analogies, at least in the later stages in learning to read (Frith, 1985 & Marsh, Friedman, Welch, & Desberg's, 1981).

Goswami recognised a flaw in Marsh et al's, (1981) studies, that suggested that children failed to make use of analogy at the earliest stages of reading because the words used in the analogy tests were too advanced. In order to investigate whether children at the very earliest stages of learning to read could use analogies between spelling patterns to help them read novel words, she devised a 'clue word' technique. This technique involves a 'clue' word such as 'beak', printed in large type on a piece of card, to be used as the basis for analogy with other words such 'peak' and 'weak'. Non -analogous test words either share some grapheme-phoneme correspondences with 'beak', such as 'bark' and 'bask', or have completely different spelling patterns like 'rain' and 'tail'. With the clue word present children were asked to read the 'test' words and their performance was compared with their pre-test reading ability.

As this task was originally conceived as a visually based strategy, Goswami chose words that shared the same number of letters, three, which came at either the beginning of a word, e.g. 'beak', 'bean', 'bead', 'beat' or the end of the word e.g. 'beak', 'peak', 'weak', 'speak'. If children were able to use an analogy strategy early on in their reading development then they would read more analogous words, with the clue word present, than non-analogous words. When no clue word was provided there would be no difference between their ability to read analogous words and non-analogous words. Goswami found that even 'non-readers' who knew just two or three words were able to make some analogies and readers of 6 years and 7 years were equal in their ability to use the analogies between spelling patterns to read new words. So, unlike Marsh et al's (1981) findings, where the use of analogy increased with age & reading ability, Goswami found that reading level was not an important factor (Goswami 1986, 1988). She therefore proposed that if the word that forms the basis for an analogy is explicitly taught, then children at all stages of learning to read can make orthographic analogies as this seems to be a strategy that they bring with them to the reading task.

Although Goswami found no quantitative, developmental effect in the ability to use analogy, there was a qualitative effect. The children of every reading level made significantly more analogies between the ends of words e.g. 'beak' - 'peak', than the beginning e.g. 'beak' - 'bean'. This effect was also apparent in nonsense words. This lead Goswami to conclude that analogies between spelling patterns at the ends of words emerge first developmentally.

Influenced by Bradley and Bryant's (1978,1983, 1985) research that had revealed the importance of pre-school rhyming skill and its predictive link with later reading and spelling, Goswami re-framed her visual - orthographic analogy theory. It seemed plausible to propose a connection between her finding that even beginning readers could make use of analogies between the ends of words, whose spelling patterns involved rhyme and the evidence that rhyming skill predicted later reading ability. The early availability of rhyme and its causal links with reading have been found in a number of studies (e.g. Baker, Fernandez-Fein, Scher & Williams, 1998; Bowey & Francis, 1991; Bryant, Bradley, Maclean & Crossland, 1998; Bryant, Maclean, Bradley & Crossland, 1990; Chaney, 1992, 1994; Cronin & Carver, 1998; Ellis & Large, 1987; Fernandez-Fein & Baker, 1997; Greaney, Tunmer, & Chapman, 1997; Hansen & Bowey, 1994; Maclean, Bryant & Bradley, 1987; Scarborough, 1990; Stahl & Murray, 1994; Walton, 1995; Webster & Plante, 1992, 1995).

She therefore proposed that children who use 'beak' as a basis for reading 'peak' are making predictions about the pronunciation of the unknown word on the basis of its spelling pattern, and the prediction is that the unknown word will rhyme with the known word. In order to test the phonological basis of her developing theory, Goswami gave some of the children in her study Bradley & Bryant's (1978) rhyme oddity task. She found that there did indeed seem to be a special relationship between rhyming and analogy (Goswami, 1990a; Goswami & Bryant, 1990, 1992; Goswami & Mead, 1992). The link suggested the possibility that children's phonological knowledge might actually affect their analysis of printed words. Children who were good at rhyming might realise that shared sounds often meant shared spelling patterns ('cat' and 'hat'). They not only rhymed, they also shared an orthographic unit, known as a 'rime', (-at).

The linguistic unit known as a '*rime*' corresponds to the vowels and any final consonant in a word. The rime of 'beak' for example corresponds to the spelling unit '-eak' whereas the rime of 'tree' corresponds to the spelling unit 'ee'. This was just one of several hypothesised levels of phonological awareness that was beginning to be explored in the literature on reading development (Treiman, 1985,1987, 1988). Another proposed intra-syllabic level of awareness corresponded to the initial consonants of a word and was called an '*onset*', for example the onset of 'beak' corresponds with 'b-' and the onset of tree corresponds with 'tr-'. These linguistic units are called intra-syllabic as they fall between the traditionally recognised level of *syllabic* awareness (that 'wigwam' has two syllables, 'wig' and 'wam') and *phonemic* awareness (that 'wig' has three phonemes /w/, /i/, /g/). It was hypothesised that an awareness of onset and rime emerged prior to beginning to learn to read, whereas an awareness of phonemes was largely a consequence of reading (Goswami, 1990; Kirtley, Bryant, MacLean & Bradley, 1989). Therefore, it would seem to follow that children made more 'end' analogies (beak - peak) than beginning analogies (beak - bean) because the shared spelling reflected a natural and early developing phonological unit, the rime. Whereas beginning analogies in Goswami's earlier studies violated the boundary of the phonological unit, the onset (b-), by including part of the rime (bea-) which required phonemic knowledge (b-ea).

If it was the case that reading initially reflects a child's phonological knowledge at the onset and rime level, the reverse would be found if the boundary of the rime unit was violated. More analogies would be made for an onset consonant cluster 'tr-' as in 'trim' than '-st' as in west (which only includes part of the rime 'est'). Goswami (1991) demonstrated that this was the case. Six year olds made a significant number of analogies between shared consonant clusters that reflected onsets (trim - trip), but did not make any analogies between shared consonant clusters that were part of the rime (west - dust). If children made more analogies between shared spelling sequences that reflect the onset, it should also be the case that the rime analogies in the earlier studies truly reflected shared spelling patterns. If the 'end' analogies only reflected some kind of rhyme-based phonological priming, there would be no grounds for claiming that children who use rime analogies are making a phonologically based analysis of the letter string. However, Goswami demonstrated that children do seem to be analysing spelling patterns in words when they make rime analogies, as six year olds made significantly more analogies when the spelling pattern as well as the rhyming sound was shared (head - bread) than when it was not (head - said).

Goswami concludes that it is the phonological status of the shared spelling unit that is important for orthographic analogies. Children will make more analogies between three letters if they correspond to the rime rather than the onset and part of the rime (beak - peak > beak - bean), and will make more analogies between two letters if they correspond to the onset rather than part of the rime (trim - trap > west - dust). Thus she proposes that analogy seems to provide a useful entry strategy to reading (Goswami, 1992). Children can make a direct link between the phonological categories that they have acquired before learning to read, namely onsets and rimes, and the spelling categories that are built up via reading. In a later study, however, (Goswami, 1993) the pattern of advantage for onsets was not replicated, leaving the status of onset units unclear.

Goswami did point out in conclusion (1993) that, soon children will realise the need to analyse the relationship between spelling patterns and smaller units of sound represented by phonemes. She also agrees with Cataldo & Ellis (1988) that learning to spell may also help children to analyse words at this phonemic level.

Fowler, Liberman & Shankweiler (1977) pointed out that children continue to make errors in pronouncing vowels long after they have ceased to make errors in pronouncing consonants. According to Goswami's hypothesis, this is unsurprising. If children initially analyse patterns of single-syllable words into onset and rime units they would only learn about vowel pronunciation in the context of the rime only. In the initial stages of learning to read, therefore, there would be no independent representation of the vowel sound in isolation from the rime. When vowels are perceived as part of the rime, Goswami posits that the variability of vowel pronunciations is considerably reduced, for example 'house' - 'mouse'. (What would children make of the rime units 't-ouch', 'f-our', 's-oul', which are just as variable as the vowel digraghs in isolation).

However, Goswami (1992) found support for her hypothesis. Children of five to six years old showed no knowledge of vowel sounds in isolation and six to seven year olds who could read could only make analogies between vowel sounds if they were digraphs (beak - heap, rail - bait). Although they could only make analogies between single vowels if they were part of a rime (wink - pink), at this reading level they could also make onset + vowel analogies. Goswami posits that this implies an increasingly fine grained and phonemically based analysis of the printed letter string, partially dependent on the size of the graphemic unit. Although, to read fluently, children will eventually represent all the sounds in words and make connections between shared spelling patterns and sound that cross that onset-rime boundary or fall within it.

Thus, children's knowledge about the orthography is affected by, and in turn changes, children's phonological knowledge.

Goswami predicts that children with poor phonological skills will be hampered in their ability to understand how spelling and sound are related. Whereas normal readers seem to use analogies spontaneously and to benefit from being taught to use analogy in the classroom (e.g. Peterson & Haines, 1992: White & Cunningham, 1990), dyslexic readers seem unable to use orthographic analogies (Lovett, Ransby, Hardwick, Johns, & Donaldson, 1989). These children will learn to read clue words like 'part' but fail to read analogous words like 'cart'. However, Goswami suggests that with extensive training, analogy provides a useful way in to reading for these children. Analogy training schemes such as the Benchmark programme have been specifically developed for dyslexic readers (Gaskins, Downer, & Gaskins, 1986). They can then benefit from being taught to use onset and rime analogies in reading, just as she suggests, normal children can.

Alternative Views.

Ehri, 1992, 1995.

An alternative view is advanced by Ehri (e.g., 1992, 1995) who characterised reading development as progression of stages in which children's representations develop through the application of phonological knowledge. Initially, children may recognise words in their environment using only salient visual cues (e.g. the golden arches in McDonalds or the capital letter at the beginning of their name). However, as their letter-sound knowledge and segmental ability increases, children recognise words by forming partial alphabetic connections between some of the letters in written words and sounds that children detect in their pronunciations (Ehri & Wilce, 1995; Rack, Hulme, Snowling, & Wightman, 1994). With increasing reading experience these partial connections develop into more precise representations of the orthography by forming connections between all graphemes and phonemes in words (e.g. Ehri & Wilce, 1987). These precise correspondences between orthography and phonology become fixed in memory in what Ehri calls a 'full alphabetic' or 'cipher stage'. In the fourth and final 'consolidated alphabetic' stage, children take advantage of the statistical regularities in written language to map larger letter units. "Thus, in this final phase, rime units might emerge as consolidated units in memory from their occurrence in several sight words (e.g., 'est' from 'west,' 'best,' 'zest') (Savage & Stuart, 1998). But to use rime as the basis for analogy when reading novel words, Ehri & Robins (1992) found that pre-readers needed to have phonic skills in place.

Stuart and Coltheart, (1988).

However, Stuart & Coltheart (1988) reject the view that development proceeds in a succession of qualitatively distinct phases or stages, with the utilisation first of visual strategies, then alphabetic, followed by an orthographic phase. Their view is that children who are already phonologically aware and knowledgeable about letter-sounds when they are first required to learn to read have the necessary cognitive processes and concepts in place to develop lexical and sub-lexical processes simultaneously. Logographic or pre-alphabetic strategies are default strategies available to and used only by children who have no other relevant and useful knowledge to bring to bear.

Rime Awareness v Phonemic Awareness.

Support for the view that rimes are involved in children's reading come from a study by Treiman, Goswami, and Bruck (1990), in which non-words containing familiar orthographic patterns were more likely to be read by children in grades 2, 3, and 4 than words based upon the same grapheme-phoneme correspondences but in less frequent letter strings. Two studies, however, (Bowey & Hansen, 1994; Bowey & Underwood, 1996) have failed to replicate this pattern in the youngest age group of children, and concluded that rime frequency effects emerge as children become more skilled readers, as both Ehri's model and Stuart and Coltheart's model would predict. Also, Seymour & Evans (1994) and Duncan, Seymour & Hill (1998) failed to find the developmental progression from rhyme to phoneme based segmental strategies.

It is evident that, by either Goswami's account, Ehri's or Stuart and Coltheart's account, the development of orthographic representations is seen to depend on phonological awareness and alphabet knowledge; however, different levels of PA are required by each of these models of reading acquisition. Goswami's argument, that rime units are the basis of children's earliest representations depends on the finding that, typically, rhyme awareness is developed earlier than phoneme awareness in speech (Kirtley et al., 1989; Stanovich et al., 1984). However, the specific predictive link between pre-school rime awareness and subsequent reading ability has not always been found (Lundberg et al., 1988; Muter, Snowling, & Taylor, 1994; Yopp, 1988), whereas, the link between phoneme awareness and subsequent reading ability is robust (Hoien et al., 1995; Muter et al., 1997; Muter, Hulme, Snowling, and Taylor, 1998).

Muter, Hulme, Snowling, and Taylor (1998) found, in contradiction to Goswami's theory, that phonemic skills were better predictors of reading than rhyme skills. The data from their longitudinal study that measured onset-rime awareness at 4 years did not predict reading development measured at 6 years. The link between phonemic awareness and learning to read was found to be stronger than the link between rime awareness and learning to read. The results of studies by Deavers & Solity, (1998), Nation, Allen, & Hulme (Submitted) and Nation and Hulme (1997) support this finding.

It is, therefore, apparent that the basic tenets of Goswami's theoretical model are not universally accepted. The issue of lexical transfer or 'analogy' is unresolved, and the issue of the size of unit for an entry strategy into reading as well as for analogy hotly disputed (Muter et al., 1994; Savage, 1997; Savage & Stuart, 1998).

The Role of the Clue Word in Analogy.

The early availability of analogy strategies has been confirmed in a number of studies. For example, Ehri & Robbins (1992), Muter, Snowling & Taylor (1994), Walton (1995) and Moustafa (1995), using paradigms similar to Goswami's clue word task reported the use of analogies in 5-6 year olds. Ehri & Robbins, however, argued that some decoding skills were required to read new words by analogy, as only the children in their sample who could phonemically re-code 5 simple 'nonsense' words like *kin* and *bev* made a significant number of analogies in various post-tests. Muter et al., also had misgivings, as they pointed out that children had a concurrent referent throughout the task as the clue word was pronounced and usually presented alongside the target word. They argued that a stronger case for rime units as the basis of orthographic representations could be made if rime transfer could be demonstrated in the absence of concurrent clue word information. Muter et al. compared the level of transfer to rime analogous words (e.g. ring - king) and common letter controls (e.g. ring - sign), from a previously taught clue word, either in the presence of clue words or without the clue words present at the time of transfer. Strongly significant transfer effects were found in the presence of clue words, with markedly reduced transfer in the absence of prompts, suggesting the prompts play an important role. Savage & Stuart (1998) note, however, that there was a very high ratio of rime analogous to control words which may have unnaturally increased the salience of the rime.

Savage (1997) therefore reviewed all the studies to date and concluded that there was no convincing evidence for spontaneous analogy transfer in the absence of clue word information. He found that while there are several studies that have looked at transfer without the clue word present, these have either involved explicit teaching of rime or onset level units prior to transfer (e.g. Goswami, 1988, 1991) or, as in the studies of transfer in connected prose (Goswami, 1988) have not reported an advantage for rime over other units.

An Empirical Investigation of Goswami's Model.

Analogy theory suggests that the advantage for words which share orthographic rimes with a given clue word arises because;

- As an entry strategy into reading children perceive the orthographic similarity between rimes of clue and target words.
- The clue word is pronounced for them
- This gives them a pronunciation for the shared rime
- Children's rhyme awareness enables them to conclude that word endings (rime units) which look the same will also sound the same.

Which gives rise to four important unresolved issues that were investigated in Savage & Stuart's (1998) study:

1. Spontaneous use of rime units to read novel words with a single exemplar.

To investigate whether children can make lexical analogies as an entry strategy into reading by perceiving the orthographic similarity between rimes of clue and target words, the following experimental condition was included in Savage and Stuart's first experiment;

Children in a no concurrent prompt condition were taught a single example of the relevant clue words to criterion on flash cards but were not given precise information as to how to use the clue words. This no prompt control condition could therefore be taken as a measure of spontaneous analogy transfer as it was the closest to 'real life' conditions.

In addition, to explore the special phonological status Goswami awarded to the rime unit (e.g. r*ail*-s*ail*) for analogy, a third of the clue and target words in experiment 1 also shared a 'head' unit (e.g. *rai*l -*rai*n) and a third acted as controls.

2. The function of a phonological prompt.

The possibility that a concurrent phonological prompt is equally as effective as Goswami's use of a combined orthographic and phonological prompt was also explored in experiment 1;

In a phonological prompt only condition, no external orthographic representation of the clue word was made available to the child, upon which the process of analogy described by Goswami might begin to work. The child was simply told at pre-test "Your clue word says (e.g. beak) and on presentation of the target words the clue word was pronounced with every second word. Therefore if the advantage for target words sharing rime units with clue words was equally strong in a 'phonological prompt' as in the 'combined orthographic and phonological prompt' condition, this would cast doubt on the assumption that children derive pronunciations for target novel words by a process of orthographic analogy.

3. Spontaneous use of analogy to read novel words with more than one exemplar of a clue word but no concurrent prompt.

Savage and Stuart proposed that the number of 'clue' words known by a child may be important in producing analogy in the absence of concurrent prompts as this could reflect naturalistic reading experience. Therefore experiment 2 included a condition in which two groups were taught 3 examples of a clue word to criterion.

4. The size of units involved in lexical transfer.

One of the groups taught 3 examples of a clue word to criterion were taught clue words that shared only vowel digraphs with the target words and the other group were taught only words that shared the rime with the target words. In this way it was hoped to establish the size of units used in transfer by comparing the degree of transfer of words sharing orthographic rimes, which according to Goswami's model have 'phonological status' (e.g. l*eak*-p*eak*), and words sharing only the medial vowel digraph (e.g. l*ea*k-b*ea*n) which do not have phonological status in Goswami's model, but which Ehri (1995) considers important.

Experiment 1.

The pre-test, training, and post-test phases were all carried out in a single session. Two sessions were required for each participant with half the experimental stimuli presented in each. During the pre-test phase, children were asked to read all novel target words as a baseline measure of their knowledge of these words. Training was then carried out according to the prompt conditions outlined below followed by the post-test phase when the children were again asked to read all the novel target words, and subsequently all the associated clue words.

Sixty children, with an average reading age of 6 years and 3 months, were divided into four carefully controlled groups.

In the *combined orthographic and phonological prompt group* children were shown clue words and told that they were a clue to reading new words. Throughout training the clue word was placed next to the target word and pronounced by the experimenter who also asked the child what it said. A block of 6 target words was then presented and the clue word was indicated and pronounced after every second target word.

In the *phonological prompt only group* the words were only spoken in the pre-test phase and repeated after every second target word in the training phase.

In the *no prompt group* the children were taught the clue words on flash cards to a criterion of three consecutive correct responses. The flash cards were then hidden and the target words presented with no further assistance.

In an *untaught group* the children were presented first with the clue words to read followed by the target words.

The target words contained an equal number of rime, head and control words.

Results.

In the *combined orthographic and phonological prompt condition* there was a significant advantage for both rime and head clued words but not for control words, with the rime word advantage significantly greater than the head. Savage and Stuart point out that this replicates Goswami's findings from previous experiments (Goswami, 1986,1988, 1990a).

In *the phonological only prompt condition*, however, in spite of the lack of a concurrent orthographic prompt, there was a significant advantage for rime clued words equal to the combined group, as well as a significant advantage for the head clued words which was significantly greater than the combined group. Savage & Stuart suggest that the improvement from pre to post-test represents purely phonological activation of related words, rather than the use of phonologically underpinned orthographic units as suggested by Goswami (1993). This is an important finding as in this view, when a rhyming word is heard concurrently in the clue word task it biases children towards responding with a rhyming response once they have partially decoded the target word e.g. the initial letter-sound. The same would apply to head-words if the partial decoding consisted of the final consonant. The possibility that this bias arises due to the children making orthographic analogies is precluded because they have only heard and not seen the clue word prompt and therefore are unable to compare the spelling patterns of the clue and target words. This conclusion would seem to be supported by the fact that the phonological prompt group's clue word reading was significantly poorer than the combined group's clue word reading at the post-test, despite their equivalent improvement in reading clued target words.

These results demonstrate that concurrent orthographic clue word information is not essential for pre- to post-test improvement in target word reading.

A second important result in Experiment 1 was that in *the no prompt condition,* that most closely resembles naturalistic reading, there was no sign of any pre- to post-test improvement with only a single clue word available as a lexical analogue. This was in spite of the fact that the group was nearly at ceiling on their ability to read the learned clue words and were significantly better than all other groups on clue word reading. This suggests that they remembered the clue words but were unable or unwilling to use the shared orthographic and phonological units to derive the pronunciations of target words. The *untaught group* showed no significant improvement.

Conclusion for Experiment 1.

Savage & Stuart conclude that these results strongly suggest that the use of orthographic analogy from a single stored source of lexical knowledge is not an acquisition strategy available to children in the earliest stages of learning to read. In the situations which most closely approximate naturalistic reading, the taught but no prompt condition and the untaught condition, 6-year-old readers do not appear to be able to take advantage of a single stored lexical analogue to acquire new pronunciation knowledge.

The results from the clue word studies, therefore, appear to be specific to the given experimental situation and are unlikely to generalise to a naturalistic reading task in which children in the earliest phases of learning to read are rarely provided with an appropriate analogue (Deavers & Solity, 1998)

Experiment 2.

Experiment 2 explored the possibility that spontaneous use of lexical analogy, in the absence of concurrent prompts, might occur if children were pre-taught more than one exemplar from which inferences might be drawn. It also aimed to investigate the degree of transfer of words sharing orthographic rimes compared with words sharing only the medial vowel digraph. Forty two children, with a mean reading age of 6 years and 6 months, were divided into three groups, two of which were taught 3 exemplars of the clue word to criterion, either in the rime condition or the medial vowel digraph condition and the third was untaught.

Results.

Overall, more vowel and rime words were read by children in the two pre-taught conditions, which suggests that when children are taught more than one exemplar they can make analogies. The important finding in Experiment 2 is that there was no significant advantage for rime over vowel digraph words, demonstrating that small units are enough for lexical transfer as Ehri suggests. However, although a high level of clue word knowledge was displayed by all the groups, transfer effects to target words were comparatively rather weak. There were many times when children knew three clue words but were unable to pronounce the target words sharing either orthographic rimes or vowel digraphs.

Final Conclusions.

Taken together, the results of these two experiments suggest the following;

- That spontaneous application of stored lexical knowledge can take place in the absence of concurrent prompts but it depends upon the availability of more than a single stored lexical exemplar.
- When taught three clue words, children could transfer orthographic knowledge to the previously unknown target words in the absence of concurrent prompts, suggesting that this is not an entry strategy into reading, as Goswami suggests, but a strategy that could be operational once a number of orthographic clue word examples have been learned.

- The finding that concurrent phonological prompts were as effective as combined orthographic and phonological prompts in producing rime transfer, and significantly more effective producing head transfer, demonstrates a purely phonological activation of related words. This finding was supported by Bowey, Vaughan and Hanson (1998) who found equivalent transfer between rhyming clue words and target words that had either the same spelling pattern (bone-cone) or different (bone-moan). This lead them to conclude that beginning readers do not make analogies that cannot be accounted for in terms of purely phonological priming. This finding was replicated by Nation, Allen and Hulme (1998), who like Savage and Stuart also included a phonological prompt group. They propose that the availability of phonological primes, in combination with limited orthographic knowledge, are jointly responsible for the transfer effects obtained. They suggest that the children in their study, whose average reading age was 6 years 1 month (2 months less that the participants in Savage and Stuart's first experiment) had developed the rudiments of letter-knowledge and most of their reading attempts were characterised by efforts to use letter knowledge to sound-out the words. Generally, they were able to pronounce the initial and final consonants but tended to make errors on the vowel digraphs, which Stuart and Coltheart (1988) had identified as being particularly difficult for children to read. Consistent with this, 82% of the children's target word errors began with the correct sound. Thus, Nation et al. conclude, they were sometimes able to make what could be termed a partial decoding attempt, that when combined with the presence of a phonological prime was enough to elicit the correct pronunciation. This is further evidence against Goswami's assumption of a process of lexical analogy in which children's rhyme awareness enables them to conclude that word endings which look the same will also sound the same.

- Where the use of clue word knowledge to make lexical inferences is tested under more naturalistic circumstances, the modest but significant lexical transfer that exists indicates that children found the transfer as easy when target words shared common vowels as they did when words shared common rimes. Savage and Stuart therefore conclude that the results of these studies demonstrate that transfer patterns can be explained by the use of small grapheme-phoneme units and do not support the view that children use rime unit representations early in reading development.

Goswami (1999) takes exception to this conclusion, as she suggests that it is not permitted by Savage and Stuart's data. She suggests that basic analogy theory states that the more exemplars known to a child, the more likely the child is spontaneously to use an analogy, as they did, she points out, in Savage and Stuart's Experiment 2. She also insists that rime analogies are the most reliable especially in the 'earliest phases' of reading acquisition. It appears that the term 'earliest phases' is the key to this dispute as it is interpreted differently by Goswami than by Savage and Stuart. Although Goswami accepts that the more exemplars of a clue word that are known, the more likely analogy is to be used, she overlooks the amount of reading experience required to glean the number of exemplars necessary. Even if children are orientated to use rime-level correspondences from the beginning, their use of such correspondences is dependent upon the establishment of a sufficiently large reading vocabulary to enable rime-based reading (Bowey & Underwood, 1996). By the time a sufficiently large reading vocabulary is established to be able to infer the pronunciation of novel words, the child is no longer in the 'earliest phases' of learning to read according to Savage and Stuart's implicit interpretation. As they found that children with a BAS reading age of 6 years and 3 months were unable to make analogies without the aid of a concurrent prompt and with only one exemplar for lexical transfer, it would be logical to assume that more reading experience would be necessary to acquire a sufficient body of clue words to use as a basis for analogy. Therefore it is implicit in their conclusion, that by the time three exemplars of a clue word have been learned under naturalistic conditions the child, although still a novice reader, has passed through the 'earliest phases' of learning to read by means of small units such as gpc's, a conclusion supported by the characteristic behaviour demonstrated by the children in Nation et al.'s (1998) study. Even stronger evidence for the use of small units comes from the study by Bruck & Treiman (1992) who taught children to read ten rime analogous word pairs (e.g. pig -rig) as well as ten vowel analogous pairs (e.g. pig-rib). Although the children learned the rime analogous pairs more quickly than the words sharing other kinds of orthographic similarity, they were worse at retaining this knowledge only one day later, compared with children who had learned head and vowel analogous pairs. The advantage for the non-rime units remained even when the number of learning trials was controlled statistically.

Summary.

In summary, Goswami's analogy model with its basis of onset and rime units is an elegant, well reasoned and appealing theory of children's cognitive development, but it has been demonstrated by Deavers & Solity, (1998), Bowey & Hanson, (1994), Bowey & Underwood, (1996), Nation, Allen, & Hulme, (1998), Nation and Hulme (1997) that analogy is an unlikely entry strategy into reading or even in the 'very earliest phases' of learning to read. Also, doubt has been cast on the special phonological status of the units of onset and rime and their contribution to beginning reading (Duncan, Seymour & Hill, 1997; Coltheart & Leahy, 1992; Nation, Allen, & Hulme, Submitted; Savage, 1997; Savage & Stuart 1998). However, once children have acquired the basic tools of written language e.g. gpc's, which have recently been robustly found to influence literacy outcomes (Blachman, Ball, Black & Tangel, 1994; Brady, Fowler, Stone, & Winbury, 1994; Johnston & Watson, 1997; McGuinness, McGuinness & Donohue, 1995; Robinson, 1998; Stuart 1999; Watson & Johnston, 1999), it is possible that, as initially proposed by Marsh et al, (1981), analogy strategies for word recognition may be used by children in the later stages of learning to read (see Bowey & Hanson, 1994; Bowey & Underwood, 1996; Ehri & Robbins, 1992).

Literacy Development with a foundation of Grapheme- Phoneme Correspondences.

Overview.

A number of studies have indicated that although pre-school children find phoneme awareness tasks quite difficult, this skill is rapidly acquired once they begin learning to read (Bowey, 1994; Bowey & Francis, 1991; Deavers and Solity, 1998; Liberman et al., 1974; Wimmer et al 1991). It would appear therefore that phonemic awareness is not beyond the reach of very young children. This suggests that although awareness of syllabic and intra-syllabic units such as onset and rime may precede phonemic awareness in spoken language, phonemic awareness appears to play a more significant role in learning to read. This is consistent with observations from computational models of word reading which suggest that good generalisation to new items is only apparent when spelling-to-sound translation occurs at the level of individual graphemes and phonemes

(E.g. Brown, 1997; Coltheart, Curtis, Atkins, & Haller, 1993). Research suggests therefore that a phonics based instructional programme may be more useful for children even though, as Deavers and Solity (1998) suggest, it may prove more difficult initially.

'Phonics programmes' mean a lot of different things to different people; the very word 'phonics' is guaranteed to inspire an emotional reaction amongst some teachers of reading. Traditionally, phonics programmes have involved decoding connected text, whilst engaged in the process of reading, by sounding out words to arrive at their pronunciation and meaning.

However, recently, an approach has re-emerged that was invented by the Greeks, expanded by Quintilian the famous Roman educationalist, refined by St Jerome in the 4th Century AD, practised by Ickelsamer at the beginning of the 16th Century in Germany who inspired John Hart in England by the end of that century, Montessori in 19th century France and Rudolph Flesch in 20th Century America. This approach focuses on all the phonemes in the language and how they map onto graphemes. It then brings to children's awareness how a spoken word can be segmented into phonemes and the corresponding graphemes blended into a written word, as well as how a written word can be phonologically recoded into speech. This is now a multi-sensory, error free learning approach that includes writing and spelling from the start. It is this phonics approach that will be examined here.

Tower Hamlets, 'Getting Ready for Reading' Study. (Stuart, 1999).

As the national literacy strategy (N.L.S.1998) requires schools in England and Wales to incorporate phonological awareness at both onset and rime, and phoneme levels, Stuart (1999) points out that "this reflects the current debate amongst researchers concerning the nature of the phonological units first available to and used by children in reading" (Duncan et al, 1997; Seymour et al, 1998; Goswami & Bryant, 1990; Goswami,1996). It is also incumbent on teachers to follow up the phonological awareness and letter-sound training with two years of structured phonics training.

Stuart (1999) set out to replicate and extend previous studies that found an advantage for early, intensive phonological awareness and letter sound training, with the possibility that this could provide evidence for the refinement of the instruction outlined in N.L.S. The study involved 112 participants, 55 in the experimental groups and 57 in the control groups, 86% of which were children for whom English was an additional language (EAL). Only 16 children spoke English as their first language and of the EAL children the vast majority were Sylheti speakers from Bangladesh. The mean age across the groups was 5 years.

An 'off the peg' programme called 'Jolly Phonics' (JP) designed by Lloyd (1992) was used to teach letter-sound correspondences, segmenting and blending, tracing round dotted letter shapes, and generally analysing the 40 plus phonemes in speech and linking them with the corresponding graphemes. A feature of this approach is the pace at which it is delivered, ideally introducing a new gpc every day together with rehearsing previously encountered gpc's. There is also a strong emphasis on writing practice, tracing round dotted shapes.

The usual class teachers, in a whole class setting taught the experimental groups and, although some of them were familiar with 'Letterland', the Jolly Phonics approach was quite new to them. The teacher training consisted of meeting with the researcher to discuss the general approach, at which time they were given a handbook to read and a short training video to watch.

The regular class teachers also taught the control groups and they were supplied with 'Big Books' with which they were already familiar and ideas of literacy development were discussed with them. They were particularly asked to draw the children's attention to the written words in the text and talk about the letters in the words.

The intervention lasted 12 weeks, and the teachers were asked to spend one hour a day on reading and writing activities centred round either the big books or the phonics programme. The teachers were regularly visited during the allotted hour to confirm that the intervention was proceeding as planned and to answer any queries that might arise.

Eighteen pre-test measures consisted of epi and meta level phonological awareness tasks as well as measures of oral language, reading, writing, alphabet knowledge and mathematics. Both intervention groups were well matched at pre-test for most of the measures including a below average receptive vocabulary score as measured by the British Picture Vocabulary Scales. Both groups performed at chance on a rhyme detection task and at floor for phoneme segmentation. Both groups were matched on all the literacy measures, including non-word reading, showing positively skewed distributions and floor effects. Although they were also well matched on the mathematics measure which controls for the specificity of intervention effects, it is noted that the Jolly Phonics group had an advantage for phonic knowledge, possibly due to the fact that some of this group were introduced to 'Letterland' during their first term. Letterland introduces letter-sounds by analogy to a character's name i.e. /h/ = Hairy Hat Man.

As both the pre and post-test scores violated the rules for parametric analysis, due to so many floor effects, Stuart (1999) decided to use the gain from pre to post test. This would disadvantage the JP group on the measures for which they had an advantage at pre-test, as the item sets were finite they would have less room for improvement. However, the children in both groups had made measurable improvement in the 6 months since pre-test, making comparable gains in oral language and the Big Book group was significantly better than the Jolly Phonics group at mathematics. Taken together this would support the idea that any difference in phonological or literacy measures would not be due to the quality of teaching. Auditory perception for both groups progressed at an equivalent rate, and suprisingly, so did initial phoneme identification. The Jolly Phonics group, however, were significantly ahead on phoneme segmentation, the most closely related phonological task to reading as well as all three tasks of gpc knowledge i.e. recognising letters from sound, recalling sounds from print and writing phonemes. Ideally, a blending task could have been included, as it has been reported that children with emerging literacy skills find this easier than segmenting (Fox & Routh, 1984; Johnston & Watson, 1997; McGuinness, McGuinness & Donohue, 1995). Although the raw scores on the two standardised reading measures were just not significant, tests of reading and writing high frequency words and simple consonant-vowel-consonant non-words, appropriate to emerging readers were all highly significant. One year later, both groups continued to progress on all the measures but in absolute levels of performance the Jolly Phonics group were significantly better on all phonic measures, reading measures and spelling measures, including additional more advanced literacy measures that included comprehension. Interestingly, they were now also significantly better on the two metaphonological awareness tasks, initial phoneme identification and phoneme segmentation but not on the epiphonological tasks, auditory perception and rhyme awareness. On these latter tasks, both groups were at ceiling on the auditory perception task and significantly above chance on the rhyme detection task.

This supports Seymour's (1997) proposal that phonological awareness at a meta-level is pertinent to literacy and at a meta-level research has demonstrated that there is a small to large unit progression (Duncan, Seymour, & Hill, 1997; Hoien, Lundberg, Stanovich & Bjaalid, 1995; Muter, Hulme, Snowling, & Taylor, 1997). High level ability on epi-levels of phonological awareness, according to large-unit theorists (Goswami & Bryant, 1990), should be sufficient to propel children into literacy acquisition. However, this study has demonstrated that early, structured, focused and rapid teaching of gpc's (small units) together with phoneme segmentation and blending skills accelerates literacy knowledge in 5 year olds. Stuart proposes that there is a lasting advantage for children who acquire these prerequisites at least as soon as (*if not before*) they are formally introduced to tuition in reading and writing. Moreover, she points out that children acquire these concepts easily and in a whole class setting, without the need for small group teaching.

Summary

In summary, Stuart's (1999) study demonstrates that with minimal training, class teachers can, for 1 hour a day, in 12 weeks teach pre-reading Reception children the majority of the 40 plus phonemes and their corresponding graphemes in the English language.

This is true even of children for whom English is a foreign language, and who have very poor receptive vocabularies in English. When this teaching includes segmenting and blending in simple CVC words it is causally related to significantly better reading, non-word reading, and spelling 1 year later. This evidence does not support the need to spend a lot of time over a period of two years teaching phonological awareness as the N.L.S. and large unit theorists (Bradley & Bryant 1985; Goswami & Bryant, 1990; Goswami & East in press) suggest. However, if EAL language children can easily assimilate this approach with receptive vocabularies for English equivalent to 3 & 4 year olds, would 'English first language' children be able to do the same at that age or would it be too soon in their cognitive development to cope with these concepts? This issue is to be investigated here.

Phonics in Scottish Schools. (Johnston & Watson, 1997).

Johnston & Watson (1997) posed the question, "What sort of phonics is effective and how early should it be taught?" Using the Jolly Phonics programme as the basis of the study they found very similar results to those of Stuart (1999).

Over a five-year period Johnston & Watson (1997) had been investigating how phonics is taught in Scotland. They discovered that phonics teaching usually followed a systematic programme extending over the first three years at school, as recommended by the NLS for England and Wales. At the rate of one phoneme a week letter/sounds were introduced by means of alliterative groups of words, e.g. bat, bull, bin and towards the end of the first year three letter consonant-vowel-consonant (CVC) words were introduced. Words were presented with a missing letter either at the beginning middle or end and the children had to fill in the blank. Very few classes, in the 10 schools they investigated, were taught to sound out letters individually and blend them together in a systematic way. However, one school introduced the sounding out and blending of CVC words earlier than the others and Johnston & Watson found it led to an earlier spurt in attainment. This led them to look more closely at the value of an early synthetic phonics approach, which they describe as follows, 'children are taught groups of letter-sounds and then shown words made up of those letters'. For example, once the children have learnt the relevant letter-sounds they are shown these gpc's in initial, medial and final positions in words. An experimental group of 25 Reception children were assigned to the 'synthetic' phonics condition and were matched on a range of tasks, with 29 Primary 1 children whose teaching programme included an 'analytic' phonics approach e.g.

segmenting whole CVC printed words. The children were equivalent on rhyme, alphabetic knowledge, vocabulary and Marie Clay's (1979) 'Ready to Read' Word Test.

Johnston & Watson decided to implement the letter/sound and blending condition by using the commercially available programme 'Jolly Phonics' developed by Sue Lloyd and published in 1992.

Over a period of 8 weeks they introduced the experimental group to 40+ phonemes and their corresponding single letter or digraph at the rate of 6 letter/sounds a week. It is not clear how long each teaching period lasts. In the first two weeks the graphonemes /s/ /a/ /t/ /i/ /p/ /n/ & /c/(k) /e/ /h/ /r/ /m/ /d/ were taught and the children were shown how the letters combine, in various positions, to form words i.e. 'spot' 'sand' 'nest'. (Presumably, 'spot' is shown in the third week after /o/ has been introduced).

At the end of the first term at school the 'synthetic' group were 11 months ahead of the 'analytic' group on the British Ability Scales Word Reading Test, with a reading age of 5 years 11 months (chronological age 5 years). The 'analytic' group whose chronological age was 5 years 2 months achieved a reading age of 5 years. The 'synthetic' phonics programme was now complete and the group was also ahead on emergent reading, letter knowledge and phonemic awareness tests, but not the rhyme task. The 'analytic' group continued with letter/sound teaching.

In the following March, when the 'analytic' group had been taught the sounds of all 26 letters of the alphabet the mean reading age was still 2 months behind their chronological age on the BAS Word Reading Test. Whereas, the 'synthetic' group were now 16 months in advance, with a reading age of 6 years and 8 months as well as still being ahead on emergent reading, letter/sound knowledge, and phonemic awareness but not rhyme.

In a separate study Johnston and Watson (1997) found that a group of 'synthetic' phonics taught children, at the end of the third year in school, were 9 months ahead of an 'analytic' group of the same age (7years 7months) on reading comprehension as measured by the Primary Reading Test (France, 1981), and far fewer of the synthetic group had a reading age that lagged behind their chronological age. They concluded that the rapid start not only affords the 'synthetic' group the chance to read more words independently, but also makes more time available for learning to comprehend text. However, in this paper statistical analyses are not made available, so it is difficult to get 'a feel' for the data. For instance, it was interesting to note that the reading ages of 9% of the experimental children were more than 12 months behind their chronological age as opposed to 31.5% of the 'analytic' group. How many other children were less than 12 months behind? It would be helpful to know the standard deviations as well as the mean scores, to get some idea of the spread of the data. For instance, was the data positively skewed, with a large number of children unable to score? Another problem for this study was that they mentioned that the children are taught groups of letters and then shown words made up of those letters in different positions. Although blending was particularly emphasised (moving from individual sounds to make whole words) it is unclear if the children were also shown whole printed words with instruction regarding the position of the sounds within the words similar to the analytic condition. They also had a set of irregular words taught as sight words. So it may not be strictly accurate to view the differences between the two groups as an analytic approach compared with a synthetic approach. The central difference is the pace and intensity with which the 'synthetic' approach was carried out prior to formal reading instruction, whereas the 'analytic' approach was an integral part of reading instruction.

Summary.

In summary, this study, together with Stuart's (1999) study, demonstrates the possibility that gpc's introduced early in formal literacy instruction and blended and segmented into simple words with a one to one letter-sound correspondence, can produce significantly greater gains in reading and metaphonological awareness tasks. The pace of the training programme seems to be an important feature. The fact that it can be completed in the first term of the reception class means that children have an immediate and explicit awareness that written language is encoded from the sounds they speak. They are then in possession of the tools needed to become independent readers, e.g. graphonemes, blending skill, and a simplified framework (Seymour et al, 1992) that can act as a self teaching mechanism (Share 1995) from which they develop higher order reading skills.

Phonics v. Onset-Rime Analogy Training. (Robinson, 1998).

To date no one had made a direct comparison between training in, what Duncan, Seymour and Hill (1997) describe as 'small unit theories' (gpc's) and 'large unit theories' (onset and rime). So in partial fulfilment for her Master's Degree, Robinson (1998), set out to investigate which of the two training approaches was the most beneficial to children in the early stages of reading in school.

The participants were 51 children in a South London primary school Reception classes, with a mean age of 5 years. The children were divided into two groups matched on pre-tests of rhyme detection, onset-rime segmentation, phoneme segmentation, letter sound and letter name knowledge. There were 26 children in Group 1, who received onset-rime training with Oxford Reading Tree Rhyme and Analogy Pack, and 25 in Group 2, who received phonic training with the Jolly Phonics Pack.

In the onset-rime condition, the children's attention was drawn to the initial sounds of alliterative words as the teacher read a story from a 'Big Book'. The children were then asked to say which letter they would need to write the sound. Rhymes were based on the story book rhymes and then linked with the letters in a more systematic way. For analogy training, children's attention was drawn to the shared spelling patterns and they practised generating rhymes and identifying rime families, (e.g. h*at*, *cat*, m*at*- *send*, m*end*, l*end* etc.), with many activities and games to support this approach.

In the phonics condition, children were taught 42 gpc's, in groups of 6, two a day for three days with two days consolidation. Children identified target sounds in words and practised writing the graphemes. Three letter words were introduced that included the sounds currently being taught as well as words used for revision of previously learnt gpc's. As with the onset-rime group, this group had many other activities, games and videos to support the gpc training.

Results.

It was anticipated that the rime trained children should do better at post-test on onset and rime segmentation and rhyme detection as well as improving on single letter sounds. The phonics-trained children were expected to do better at on phoneme segmentation and letter-sound knowledge. However, contrary to expectation, the rime-trained children did not perform significantly better than the phonics trained children on either the rhyme detection task or the onset and rime segmentation task, although they did show highly significant improvement between pre- and post test on both the letter-sound recognition test and letter sound recall test. Nevertheless, they were significantly poorer on both these tests than the phonics trained children who also performed significantly better at post-test on the phoneme segmentation task.

Neither group, however, achieved a reading age on a standardised reading test at post-test, but the phonics group could read more simple three letter CVC words than the onset-rime group, ($p = .056$, jns). Ten of the words on the word list favoured the onset-rime group and 10 favoured the phonics group. There was no significant difference between onset-rime favoured words between the groups but the phonics trained children were significantly better at reading the remaining words. Robinson concludes that this outcome was indeed due to the different training received. The groups performed equally well at post-test on letter name knowledge demonstrating the effect was specific to type of PA training.

Summary.

This study demonstrated that in a whole class setting 5 year-old children could learn more phonemes in the language than are represented by the 26 single letters of the alphabet (a mean of 35.56 gpc's recalled by the phonics group compared with 10.32 for the onset-rime group).

Although there was a significant improvement in segmentation skill for the phonics group and they could read CVC words better than the onset-rime group, these children suprisingly failed to achieve a reading age on a standardised test. This may be due to the fact that little blending and segmenting practice was included in the training, which concentrated on learning and identifying the gpc's in words. Blending and segmenting gpc's is a skill which novice readers find very difficult and in order to take advantage of children's initial early learning of gpc's it would seem advantageous to practise both blending and segmenting as soon as the first few gpc's have been acquired. This is the specific focus of the current investigation.

Final Summary.

Research has demonstrated that phonological awareness has a role to play in literacy acquisition. However, in spite of the inevitable problems of comparing asymmetrical groups, there is a body of evidence that demonstrates the extreme difficulty that individuals without alphabetic knowledge have in manipulating phonemes in spoken words. This evidence supports the claim that literacy acquisition has a reciprocal relationship with awareness of the smallest and most vital phonological unit for literacy, the phoneme. Although Goswami and Bryant (1990) suggest that phoneme awareness can be facilitated through training in rhyme and alliteration, it is argued here that if the goal is to bring phoneme awareness to children, why not do just that.

No study has conclusively and unambiguously demonstrated that the naturally developing phonological awareness that children bring to the task of reading in the complete absence of alphabetic knowledge or familiarity with print plays a causal role in reading development (Share, 1995). Undoubtedly, training in *phonemic* awareness in the course of literacy instruction makes a significant difference to reading development. But if the purpose is to enhance children's literacy skill, it seems to be sub-optimal to learn about a sound whose exclusive role is to represent a letter in written language, without the letter present.

Goswami's analogy model with its basis of onset and rime units is an elegant, well reasoned and appealing theory of children's cognitive development, but a growing body of research has demonstrated that analogy is an unlikely entry strategy into reading or even in the 'very earliest phases' of learning to read. However, it has been shown that analogy strategies for word recognition may be used by children in the later stages of learning to read.

On the other hand, current research is converging on the evidence that gpc's introduced early in formal literacy instruction and blended and segmented into simple words can produce significantly greater gains in reading and metaphonological awareness tasks. Once children possess the tools needed to become independent readers, i.e. gpc's, segmenting and blending skill and a simplified framework, a self-teaching mechanism is triggered from which higher order reading skills can develop. Stuart and Masterson (1992) found that children who arrive at school with letter-sound knowledge are more skilled readers as 10 year-olds.

The conclusion is therefore that, for optimal literacy development, children need to be made aware of the phonemes in their language and how they are represented by graphemes. They also need to know that written language is fundamentally the blending together of the gpc's into words, sentences and meaning. Although some individuals acquire this concept very easily, it is not a naturally developing ability as it has only been 3000 years since the inception of the concept. Research has shown that the sooner children gain this insight into written language, the better able they are to cope with the idiosyncrasies of written language and written English in particular.

The Proposed Model of Literacy Acquisition.

One of the findings in Bus and Ijzendoorn's (1999) review of PA training studies was that the earlier children were introduced to literacy related training, the better the outcome for literacy acquisition. It is proposed therefore that children, as young as three and a half, could benefit from being introduced to the alphabetic principle prior to formal literacy lessons in school. For the last 500 years, it has been common practice for parents and teachers to introduce children to the alphabet in order and by letter name and as outlined in Chapter 1, this is a sub-optimal strategy as the letter-names bear little resemblance to the sounds they represent. Empirical psychological studies have converged on the theory that it is the awareness of phonemes in speech that is the most useful foundation for understanding written language. As a phoneme is an abstract unit of sound, conceptualised by the ancient Greeks, 3,500 years ago, for the purpose of devising a written language system, it is proposed that phonemes should be brought to children's awareness together with their corresponding graphemes, thus making the unit of sound more concrete. There are 44 phonemes in English, which are represented in a systematic way by the 26 letters of the alphabet, that combine to form corresponding graphemes. Although English has a deep orthography, there are high frequency digraph graphemes that most commonly represent each of the phonemes. It is proposed that these 44 high frequency grapheme-phoneme correspondences be introduced to children as a foundation for written language and as an alternative to learning alphabetic letters by name as an initial introduction to written symbols. This does not preclude learning the single letter names together with the phoneme (e.g. "It sounds like /t/ and its name is T"). Further, as it is at the segmenting and blending stage that children encounter difficulties (Stott, 1964), it is suggested, as Hart proposed as long ago as 1570, that once children have learnt a few gpc's, they can practise segmenting a word into its constituent gpc's and blending gpc's into a written word. As the concentration span of 3 year-olds is very short, a new gpc can be included with previously introduced gpc's to form words for a few minutes a day, in a whole class setting in kindergarten or play school or even at home with a parent.

In the past, skills and drills training took one or two years before sufficient mastery of written symbols permitted encounters with connected text (Davies, 1973; Flesch, 1955). However, Stuart demonstrated that five year-old children with an English vocabulary equivalent to English three to four- year old children could easily master the concepts in a daily structured literacy hour over a period of 12 weeks. However, current learning theory posits that 'little and often' is more appropriate for very young children (Deavers and Solity, 1998), so brief, explicit sessions are proposed with error-free learning and plenty of guidance and feedback (Glaser, 1980).

In order to control the level of difficulty of the words to be generated by the gpc's it is proposed that only words that can be blended from the sounds previously learnt will be introduced. This will involve segmenting the spoken word into phonemes, mapping the phonemes onto graphemes and blending them into a written word. Once a number of words have been spelt in the first week, they can be used to model short sentences (stories), starting with capital letters and ending with full stops, in the second week.

For this study, as many of the 44 gpc's as possible will be introduced at the rate of one a day over a period of 8 weeks. It is not expected that very young children will retain all the gpc's. However, a daily few minutes generating a story from speech onto the white or blackboard with capital letters, full stops, question marks will, at the very least, provide an implicit understanding that written language is generated from speech sounds. At the very best, it will provide children with a framework for setting up a written language recognition and production system.

Chapter 4
Baseline Measures.

The purpose of this study is to examine whether an 8-week introduction to the way the 44 grapheme-phoneme correspondences in the English language can be blended into words and segmented back into sounds will enhance literacy acquisition for the experimental nursery children in comparison with an equivalent control group. The early years units of two south London primary schools were invited to take part in this study, one for the experimental intervention and the other as a control.

A range of tests was administered to ascertain whether the groups were well matched and to establish a baseline measure. The details and rational of the tests to be administered will be discussed in this chapter together with a profile of the participants and the results of the baseline measures. The design and procedure of the intervention will follow in chapter 5.

Overview of Baseline and Outcome Measures.

Prior to the intervention, twenty-six tests were administered, by the experimenter, over 4 sessions throughout the first term in nursery, September to December 1997. The children were tested on a total of 14 control measures (see Table 4:1). These comprised 2 measures of oral language, 1 measure of non-verbal intelligence, 1 measure of auditory discrimination, 1 measure of phonological awareness, 3 measures of phonological memory and 1 of visual memory, 4 measures of alphabet knowledge and 1 of mathematics. Eleven experimental measures of explicit phoneme awareness, gpc knowledge and literacy were also tested (see Table 4.1a). These comprised 2 measures of phoneme awareness, 3 measures of phonic knowledge, 5 measures of reading ability and 1 measure of writing. The intervention would be expected to impact on these measures.

Table 4:1.
Baseline Control Measures

	Oral Language.
1	BPVS
2	Morphological Awareness.
	Non-Verbal Ability.
3	McCarthy's Scales.
	Auditory Perception.
4	Auditory Discrimination & Att.
	Phonological Memory.
5	Word Repetition.
6	Non-Word Repetition.
7	Digit Span.
	Phonological Awareness.
8	Rhyme Detection.
	Visual Memory.
9	Greek Letter Test.
	Alphabet Knowledge.
10	Recite Alphabet.
11	Letter Name Recognition.
12	Letter Name Recall.
13	Write Name & Letters.
	Mathematics.
14	BAS Number Skills.

Table 4:1a.
Baseline Experimental Measures

	Phoeme Awareness.
1	Initial Phoneme Identification.
2	Phoneme Segmentation.
	Phonic Knowledge.
3	Letter Sound Recognition.
4	Letter Sound Recall.
5	Write Sounds.
	Reading.
6	Print Concepts.
7	BAS Single Word Test.
8	Young's Reading Test.
9	Regular & Irregular Words.
10	Non-Words.
	Writing.
11	Write Regular & Irregular Words.

Immediate post-tests of letter-name and letter-sound recognition and recall were carried out in both schools at the end of the intervention period. (An overview of the sequence of events can be seen in Table 4.2)

Twenty of the baseline measures were re-tested during the final summer term in nursery (mean age for the groups was 4.2years), ending in July 1998 and an overlapping battery of 25 tests were administered one year later at the end of the Reception year ending in June 1999.

Table 4.2. Time Sequence of Intervention and Data Collection Points

1997	1998	1998	1998	1999
Sept - Dec	Jan - March	March - April	June - July	May - June
Baseline Measures	Intervention	Immediate Post Tests	Nursery End Post Tests	Reception End Post Tests
Mean age 3.55	Mean age 3.8	Mean age 4.0	Mean age 4.2	Mean age 5.2

Participants;

A total of sixty-three children in the 'early years' units of two South London primary schools were recruited for this study. Thirty-one children (15 boys and 16 girls) in one school comprised the experimental group and in the other school 32 children (13 girls and 19 boys) comprised the control group. At the beginning of the baseline testing period, which was during the first term in the nursery, the experimental and control groups had a mean age of 3.5 years (SD 2.8) and 3.6 years (SD 3.6) respectively, with the range in the experimental school being 3 years 1 month to 4 years and in the control school, 3 years to 4 years. There was no significant difference in age between the groups.

Both schools drew their pupils from similar high rise, low socio-economic council estates with a proportion of the 'early years' children having previously attended social service day care centres. The children in both schools were mainly white, with English as their first language. The experimental school had three children for whom English was an additional language (EAL) and the control school had six EAL children. Excluded from the study were two EAL children, one in each school, who were unable to be tested due to learning difficulties. Of the 63 children included initially, five children left the experimental school before the final post tests and one child was statemented with suspected learning difficulties. Eight children left the control school, including 2 EAL children. Therefore data will be reported on the 49 children (25 experimental and 24 control) present throughout the study.

Baseline measures.

Children were tested individually in a reasonably quiet space, either in or adjacent to their classroom. The tests were presented in the same order except in occasional circumstances, when the order was varied to retain the child's attention. Each of 4 sessions lasted approximately 15 minutes with the tests grouped together to provide the least taxing cognitive effort and the greatest variety. Occasionally, a child's attention span did not stretch to a full session, either because they were unable to concentrate for long, or because they made an exceptional effort to do the tasks; in either case, outstanding tasks were completed in an extra session. To control for the children's development throughout the 8 weeks of data collection, the tests were carried out during alternate weeks in each school.

Control measures.

Oral language ability.

As oral language abilities influence literacy outcomes, it is important to match the experimental and control participants for oral language skill. The children's receptive vocabulary was therefore measured using the second edition of the **British Picture**

Vocabulary Scales (BPVS), (Dunn, Dunn, Whetton and Burley 1982). This test is easy to administer, even to children as young as 3 years. Additionally, when English is the primary language of home and school, the BPVS-11 can also be viewed as a screening test for scholastic aptitude (verbal ability or verbal intelligence) as vocabulary sub-tests have proved to be among the most important contributors to comprehensive tests of intelligence and the single best indicator of school success (Elliott, Murray, & Pearson, 1983). When English is an additional language (EAL) a supplementary set of norms is derived from the raw scores (BPVS-11, Supplementary data and norms for pupils with English as an Additional Language, Whetton 1997).

Measures were also taken of the children's **morphological awareness** as this gives an indication of children's developing ability to use and manipulate language. For this, a sub-set of items suitable for very young children were selected from the 'WUGS' Test adapted from Berko (1958) by Stuart (1986). Children were introduced to the 'Wugs' book as follows, "This is a book with imaginary creatures and people doing imaginary things, but some of the words are missing and I want you to help me". There was one practice item, e.g. "This is a Wug (picture of a Wug). Now there is another one (picture of two Wugs). There are two of them. *There are two..........." (Wug'z)* Following the practice item children have to supply 20 suffixes to a variety of pseudo-verb tenses and pseudo-adjectives that describe fantasy drawings, e.g. "This boy knows how to mot (picture of a boy kicking and throwing strange objects). He is motting. He did the same thing yesterday. What did he do yesterday? *Yesterday he" .... (mottid)* or "This dog has quirks on him. He is all covered with quirks. What kind of a dog is he? *He's a" ......(quirky) dog.* " As the responses were written on an answer sheet the experimenter said (for example) "That's good I'll make a note of that. Now let's see what we've got next". All 20 items were completed unless the child became distressed.

Non-verbal ability.

In comparing the early development of two groups of children, it is important to match them as closely as possible for general intelligence. The **puzzle-solving sub-test of the McCarthy Scales of Children's Abilities** (McCarthy 1970) was designed for use with pre-school children and corresponds closely to the Raven's Coloured Progressive Matrices (Raven, 1977) that is used extensively as a non-verbal intelligence test for older children (e.g. Stanovich, Cunningham & Feeman 1984). However, the McCarthy sub-test forms part of a battery of 6 scales which together provide normative data for children's perceptual performance, but as only the puzzle solving test was used for these baseline measures for comparison of non-verbal ability between groups, only the raw scores will be used. The puzzle-solving test requires the children to assemble a series of six straight sided, jigsaw puzzles to make pictures of animals or food. Successive puzzles increase in complexity and points were gained for the number of sides joined in a completed puzzle. The pieces of each puzzle were arranged in front of the children in a prescribed pattern. The experimenter then said "Let's see if you can put these 2 pieces together to make a cat". If necessary the child was encouraged with " I think you can do it if you try." If the child did not succeed the experimenter put the pieces together saying "See, we can make it this way". The pieces were then rearranged as before and the experimenter said "Now you do it just the way I did," but no credit was given to the child for this trial. Each puzzle was always completed either by the child or the experimenter before moving on to the next one in the series. There was a time limit of 30 seconds for the first 3 puzzles, 60 seconds for the 4th, 90 seconds for 5th and 120 seconds for 6th). Only portion of the puzzle finished within the time limit was scored. If the child was unable to complete any of the first three puzzles the test was discontinued.

Auditory Discrimination.

As performance on phonological tasks was to be compared, it was important to be sure that the children in each group had equally good auditory discrimination and general phonological awareness that research has shown to be necessary for literacy development. The **Auditory discrimination and Attention Test** (Morgan Barry 1988) assesses the child's ability to discriminate between 17 pairs of words, on the basis of differences in either voice, place, manner or cluster groups, at either the beginning or the end of words. Children were asked to discriminate between the word pairs by pointing three times to each picture representing the word, as the word pair was repeated in random order. The examiner sat beside the child so her face was not in view as the words were spoken. The book was set up in a sandwich-board fashion in front of the child and the examiner said, "I'm going to show you some pictures and their names sound nearly the same. Here's the first pair." The page was opened at the first pair of pictures (tin - bin). "Can you tell me what this is? Yes, it's a tin" or alternatively, "Yes, they are peaches but I call this a picture of a tin" The child is then asked to repeat the correct word. "And this one? Yes, it's a bin". Or alternatively "Yes, it's rubbish, it's a bin with rubbish in it". The child again repeats the correct word. "I want you to listen carefully and every time you hear me say '*tin*', point to the picture of the tin and every time I say '*bin*' point to the picture of a bin. Ready?" Each pair is repeated three times in a random order. If the child requested a word to be repeated it was recorded as an error and an extra repetition of the word pair was given. The child's level of attention and concentration were noted. Scores are derived from the number of discrimination errors made, with a possible maximum of 51. If the child showed signs of restlessness, boredom or fatigue, the test was stopped and resumed in the next session until all items had been completed. This test was designed for three and a half to twelve year olds and its aim is to provide age-related norms for phoneme perception and discrimination.

Phonological Awareness.

Rhyme awareness is another factor in a range of naturally developing phonological abilities thought to be related to literacy skill. Lack of rhyme awareness, according to Bradley & Bryant (1983) is highly correlated with reading failure. As the intervention specifically involves training in phonemic awareness and the groups will be compared on this measure, a **Rhyme Detection Test** (Stuart, 1995) was included to control for non-specific improvements in phonological awareness. There are 4 practice items and 12 test items on this forced choice task. Children were shown sets of three pictures of familiar objects whose names either rhymed (e.g., 'jar, car, star') or did not rhyme (e.g., 'gate, horse, leaf'). Children were asked to indicate whether the names rhymed or not as follows: "Let's play this game. I'm going to show you three pictures and I want you to tell me if their names sound the same, if they rhyme". The book is opened at the first page. "Look at these three, *cap, map, tap*", pointing to each picture as it is named. "Do their names sound the same? Do they rhyme?" If necessary the child is encouraged further, "*Cap, map, tap*, do they rhyme?" If the child answered correctly, "Yes, *cap, map, tap*, all sound the same, they rhyme". If the child's response was incorrect, "No? I think they do, I think *cap, map, tap*, sound the same. They rhyme, don't they?" Feedback was given in this way for the next two training items. For the following 12 test items the child was asked, "Do their names sound the same? Do they rhyme?" No other feedback was given and all responses were equally praised. Responses were recorded with a 'y' for '*yes*' and 'n' for '*no*' next to each set of words.

Phonological Memory tests.

Children's ability to retain phonological material in working memory directly influences important facets of language development, such as vocabulary acquisition, and the development of both reading and language comprehension abilities (Crain, Shankweiler, Macaruso, & Bar-Shalom 1990; Gathercole, Willis, Emslie, & Baddeley, 1992; Mann, Shankweiler, & Smith, 1984; Service, 1992; Wagner & Torgesen, 1987). Three tests of phonological memory were given. A set of 15 words was chosen to provide a test of **word repetition**, comparable with the non-words test (see below). The 15 words were chosen from a list of words that had a low age of acquisition rating, and that are likely be in the spoken vocabulary of three and half year olds. They were all nouns with relatively low phonological complexity and included five each, of one syllable, two syllable and three syllable words, presented in the same random order. Each child was asked to repeat them as follows. "Now I'd like you to say some words after me. When I say a word, you try to copy me. For instance, can you say 'rabbit'?" If necessary "Go on, you say 'rabbit' when I say 'rabbit'." Then "Good, can you say 'hat'? Very good. What about 'ladybird'? Excellent". If the child dropped phonemes consistent with the London accent i.e. *rabbi'* for *rabbit*, it was pointed out once, that they must try and repeat the word exactly, i.e "Try and say it *exactly* like I'm saying it, listen carefully, *rabbit*". All items were completed. Responses were recorded in a box next to the target word and four scores were calculated, one for each syllable length and one for the total number correctly repeated.

A **Non-Word Repetition Test** constructed by Gathercole and Adams (1993) was used, that had a set of 15 non-words, which as far as possible were also low in phonological complexity. There were five each, of one syllable, two syllable and three syllable words, none of which contained perceptually demanding fricative and affricate sounds (Miller &

Nicely, 1955). The children heard and repeated back the words in the same randomised order. The mouth of the experimenter was covered as the words were spoken. The children were told "Now I've made up some words and I'd like you to say those to me as well. They are silly words that don't mean anything, like 'grindle', can you say 'grindle'? Good, now try 'trumperine', very good." As with the single word repetition, if the child dropped phonemes consistent with the London accent i.e. 'penne-' for 'pennet', it was pointed out once, that they must try and repeat the word exactly, i.e. "Try and say it exactly like I'm saying it, 'pennet'". Responses were recorded as above and four scores were calculated, one for each syllable length and one for the total number correct. This test provides a measure of immediate recall and is a reliable indicator of phonological memory skills that is easy for a young child to perform. A further advantage is that the non-words will be equally unknown to all the children.

Unlike the word and non-word tests, the test of auditory **digit span memory** (Weschler 1974) increases in complexity. Children were asked to repeat number strings of increasing length, scoring 1 for a pair of items at each string length (e.g. 4-4 & 2-3 (1score),followed by 8-6-6 & 2-4-2 (1score). The maximum possible score was 7. The experimenter said "I want you to say some numbers after I say them. Are you ready?" The first two digits in item 1 were given (e.g 4-4) at one second intervals, in an even monotone, dropping the voice slightly on the last digit. If necessary the child was prompted with "Now, you say the numbers". If the child asked for the numbers to be repeated it was scored zero. The test was discontinued when both number strings in a pair of the same length failed to be repeated correctly. If the child successfully repeated one number string of a pair but not the other, a third number string at that length was given from an alternative list. If the third number string was correctly repeated, a score was given for that number string length. Digit span memory was the total scored at the maximum length at which the child correctly repeated two items of the same string length. This test is in widespread clinical and educational use as a test of short-term memory ability in IQ test batteries such as the Wechsler Intelligence Scale for Children - Revised (Weschler 1974).

Visual Memory.

The **Greek Letter Visual-Sequential Memory Test** (Goulandris 1991) requires the recall of sequences of Greek letters and was devised to test children's visual, sequential memory, by presenting them with unfamiliar material to avoid confounding the results with prior knowledge of letters. Sets of two, three and four Greek letters are presented for 10 seconds on a card and the child is asked to study them. "Now, I want you to take a good look at these Greek letters and see if you can remember them. Look at them really hard". The card was then removed and the child was asked to select the memorised letters from a number of alternatives printed on individual cards and laid out in a set randomised order. "Now, can you remember which ones were on the card? Good, and which way round were they? Which one was at this end?" For two letter sequences, the child chooses from four alternatives, for three letter sequences there are five choices and for four letter sequences six choices are presented. The more lenient of two scoring methods was used. The strict measure of serial recall requires that the sequence be reproduced perfectly, with no identification or order errors. For the more sensitive lenient scoring system two scores are awarded: the first for accurate identification of the correct letter and the second for the number of correct letters placed in the correct position. There was a single practice set of two letters followed by 12 sets of letters in 2 groups of 6, (group A and group B). Each group contained a 2x2 Greek letters, 2x3 Greek letters and 2x4 Greek letters. Only group A was used here to test children on the full range of 2,3, and 4 Greek letters but not to overtax these very young children with 4 sets each of 2,3,and 4 Greek letters. The Greek letter sets used were; 2x2 letters, *delta/theta* and *xi/gamma*, 2x3 letters, *pi/omega/sigma* and *epsilon/tau/psi*, and 2x4 letters, *omega/theta/psi/delta* and *sigma/pi/epsilon/lamda.*

Alphabetic Knowledge.

As the experimental children were going to be trained in letter sounds, letter name knowledge was included as a control measure for non-specific improvements in letter knowledge.

Three measures of letter name knowledge were taken; **reciting the alphabet, letter name recognition**, which involves identifying a written letter that corresponds to its spoken name, and **letter name recall**, which requires the child to pronounce the name of a written letter. For reciting the alphabet the child was asked "Can you say the alphabet?" or "Can you say your ABC's?" and or "ABC...now what comes next?"

Letter name recognition was tested by asking children to point to the 26 letters of the alphabet, presented in a three-page booklet with 9-9-8 letters per page, as the experimenter named them in non-alphabetic order. "See these letters? Can you show me which one is 'O'?" Letters commonly confused by young children (e.g. d/b/, w/m/, u/n) appeared on different pages.

Letter name recall was tested by the experimenter pointing in turn to each letter (again with letters presented in non-alphabetic order in a booklet with 9-9-8 letters per page) and asking the child to say its name. "See these letters? I'd like you to tell me their names. What's this one?" Letter name recognition and letter name recall, were presented in different test sessions and both were discontinued after 6 consecutive incorrect responses.

To compare the two groups ability to **write letters**, they were asked to write their own name in box provided on a 'student's writing form' and as many letters as they could think of in one minute. The experimenter said, "Now, I'd like you to write the alphabet or as many letters as you can until I tell you to stop".

Mathmatical Ability

As a check on the specificity of intervention effects, the British Ability Scales (BAS) Basic Number Skills sub-test (Elliott, Murray & Pearson, 1983) was included. There were 36 test questions but testing was discontinued after 6 consecutive failures or sooner if the child showed any sign of distress. If the intervention effects are specific to literacy skills, then at post-tests children should differ in literacy skills but not in mathematics knowledge. If at post-tests children differ also in mathematics knowledge, then some non-specific 'Hawthorne effects' may be operative.

Experimental Measures.

Phoneme Awareness

Two tests of phoneme awareness were given. In the **Initial Phoneme Identification Test** (Stuart, 1995) children were shown a set of 24 pictures of objects whose names began with 24 different phonemes, corresponding to the 24 letters of the alphabet that remain when x and q are omitted (e.g. /c/ for coat: /e/ for engine). Following three practice items, children were asked to name each picture and say what sound the name begins with, as follows: The first page of the booklet was opened and the child was asked, "Do you know what this is?" Incorrect answers were blamed on the drawing not the child: "Yes, it does look like a 'lion' doesn't it, but it's supposed to be a tiger". The name was repeated and then the child was asked, "What does tiger begin with? What little sound can you hear at the beginning of tiger?" The initial phoneme must be isolated from the following vowel, (e.g. /t/ not /tie/). There was no more feedback following the training items. For each test item the child was asked "And what's the little sound that comes at the beginning of (man)?" The child was praised equally for each response and all 24 items were completed if the answers included letter names or first syllables but after 4 completely incorrect responses (e.g. repeating the whole word) the test was discontinued.

For the second test an adaptation of the **Phoneme Segmentation Test** (Yopp 1988) was given, presenting only 12 of the 22 test items to avoid unduly stressing the children. Three practice items are used to show the children how to break words apart into their sounds (e.g., to repeat 'cat' as '/k/, /ae/, /t/'). The child was told, "Now, let's see if we can break up some words into their sounds. Like, if I say 'cat', let's see if we can sound it out like this, /k/, /ae/, /t/". The experimenter expanded the width between her hands with each additional phoneme. "You try and do the next one with me, let's try 'it', /i/, /t/, 'it'. Good, now if I said 'spot' what would you say? Yes, /s/, /p/, /o/, /t/ says 'spot', well done". If children just gave the first sound, they were asked, "Do you hear any other sounds?" If they gave the letter names they were told, "Yes, that is the name of the letter but what does it sound like?" The children's attempts were recorded verbatim. If a child was unable to carry out the practice items the test was discontinued.

Phonic Knowledge.

Three measures of phonic knowledge were taken. **Letter sound recognition** was tested by asking children to point to the letters that represent each of the 26 phonemes (one for each letter of the alphabet) spoken by the experimenter. "I'm going to say some sounds, and the letters that make these sounds are somewhere on this page. I want you to point to the letter that makes the sound I say. Can you show me the letter that says 's'?" Letters were presented in non-alphabetic order, evenly distributed across a three page booklet, with letters which can represent the same sound (e.g., /k/ and /c/, /j/ and

/g/) appearing on different pages. The test was discontinued after 6 incorrect responses.

Letter sound recall was tested by showing children a card with 44 graphemes (26 single letters on one side and 18 digraphs on the other) that represent 44 phonemes in English. The experimenter pointed to each grapheme in turn and asked the children, "Can you tell me what sound this letter makes? What does this letter say?" It was noted if children responded with a letter name instead of the sound. Both pronunciations were required for the graphemes /oo/ and /th/. The test was discontinued after 6 incorrect responses.

Children were also asked to **write sounds to dictation** in the boxes provided on their 'student's writing form'. The experimenter pronounced 10 phonemes (6 single letters, /s/, /a/, /n/, /m/, /r/, /x/ and 4 digraphs, /oi/, /sh/, /or/, /ng/), and the children were required to write the letter or letters that represented them. For example, "Now I'd like you to write some sounds, do you think you can show me what /s/ looks like? Can you write /s/ in this little box here?" After the first 5 single letter sounds the children were asked, "Now write the letters that make an /oi/ sound" (as in 'boil').

Reading Measures.

Reading was tested using three standardised and two experimental tests.

Firstly, the children's general **Concepts about Print** (Marie M. Clay, 1979) was examined using the specially designed book 'Sand'. The child was asked to help the experimenter read the book, "I'm going to read you this story, but I want you to help me". There were 24 test items ranging from understanding if the print rather than the picture carries the story, to knowledge about punctuation marks or recognising if words are upside down or misspelled.

In the **British Ability Scales (BAS) Single Word Reading Test** (Elliott, Murray and Pearson, 1983) children were shown lists of single words printed on a card and asked to read as many words as they could, "I've got a lot of words here and I want to know if you know any of them yet". The experimenter pointing to the first word asked, "What does this word say?" then "And this one?" until 6 consecutive errors. To avoid undue stress, at the first baseline testing session, 20 words only were presented routinely to all children.

In the **Young's Group Reading Test** (Young, 1985) the children, who were tested individually, were shown a sheet of 18 pictures, each accompanied by from three to five written words, and asked to circle the word which correctly represented the picture. The first 3 were training items and the children were asked "Look at this picture: it's a ....? Cat, yes. Now look at these words beside the cat. We have to choose the one that says cat. This one says 'in', and this one says 'went', and this one says?....'Cat', yes. So you draw a ring round this one, the one that says cat." For the test items the child was asked, "Here's a picture of a bus. You draw a ring round the word you think says 'bus'." All the items were completed.

In the **Read Regular and Irregular Words test**, to measure early word reading, children were asked to read aloud 12 high frequency words taken from a list of most common words in the beginning reading corpus (Baker & Freebody, 1989). Six of these words were 2-4 letter regular words (e.g., 'it, with, look') and six of these were 2-4 letter irregular words (e.g., 'do, she, some'). If the child could not read the word correctly, the experimenter asked, "Can you sound out the word? What sound does this letter make? Can you join them together?" Responses were scored correct if the word was instantly recognised or analysed first. However, the style of recognition was noted as either 'flash' or 'analysis' for more detailed inspection of the data.

In the **Read Non-Words** test to measure early phonological recoding ability, children were asked to read 10 CVC non-words presented in a booklet illustrated with friendly monsters, one per page. Each monster had a CVC name (e.g.'jid, cug') which children (following 3 practice items) were asked to read: "I wonder if you can tell me what this monster is? It's a...?". If a child was unable to make an attempt at reading the non-words, the book was completed with a discussion about the monsters.

Writing Measures.

The children were asked to **Write Words to Dictation**, "Now, can you write some words for me? Can you write the word 'can' in this box here?" If the children were unsure or stopped writing they were cued with, "What sounds do you hear?" There were 10 high frequency, 3-4 letter words (Baker & Freebody, 1989), 6 of which were regular words (e.g.,'but, yes') and 4 of which were irregular words (said, come'). The children scored 1 for each word written correctly. The test was completed if the children were happy to 'write' something but discontinued if the child found it too difficult.

When all the tests were completed, the children were handed 'Bath Time' by Sandra Iversen, 'a first reading' book with a simple, repetitive, one line sentence on each page and asked, "Do you think you could read some of the words in this book?" The aim was to present this book again at the final post-test at the end of the Reception Year and compare the reactions of the children in the control and experimental schools to a natural reading situation.

Baseline measures were taken in the following order;

1. BPVS, recite alphabet, write name & write letters, letter name recognition, puzzle solving and concepts about print.
2. Young's reading test, rhyme detection, letter name recall, read words.

3. Recall of digits, write sounds, write words, letter sound recognition, t for tiger, word repetition, non-word repetition, BAS number skills.
4. Letter sound recall, phoneme segmentation, read non-words, BAS reading test, morphology test, visual memory test, phoneme discrimination.

Results

Summary of Baseline Results and Profile of 3.5 Year-Old Children.

The non-significant results in tables 4:A, 4:A cont. and 4:B show that the children in both the experimental (E) and control (C) groups were well matched at pre-test on all the experimental and control measures. The baseline measures are interesting as they provide a profile of the achievements of three-and-a-half-year-olds from socially deprived inner city areas. It is worth, therefore, discussing each measure in more detail.

As most of the baseline distributions were negatively skewed, showing floor effects on all the experimental measures, the results were analysed using non-parametric Mann-Whitney Tests.

Table 4:A Summary of Baseline Measures

Control Measures.

Oral Language.		N 25	N 24		
		Experimental	Control	Test Stat.	Probability.
BPVS Standardised Scores	Mean	89.63 (N24)	88.75		
First 6 sets of 12 questions.	SD	7.73	14.05	t= .267	n.s.
Morphological Awareness	Mean	3.56	3.13		
Wugs' Maximum score 20	SD	2.99	3.37	z= -.672	n.s.
Non-Verbal Ability					
McCarthy's Scales Sub Test	Mean	3.24	4.33		
Maximum score 22 for 6 puzzles	SD	1.94	4.34	t= 1.146	n.s.
Auditory Peception					
Auditory Disc.& Attention Test	Mean	18.86 (N21)	17.39 (N23)		
(error scores) 3 trials of 17 Items= 51	SD	15.94	12.45	z= -.129	n.s.
Phonological Awareness					
Rhyme Detection	Freq.	1 child (4%)	1 child (4%)		
Above chance 10/12 items.					
Phonological Memory					
Word Repetition	Mean	12.96	13.88		
Maximum score 15	SD	3.35	1.76	z= -1.215	n.s.
Non-Word Repetition	Mean	11.4	12.17		
Maximum score 15	SD	3.65	2.6	z= -.527	n.s.
Digit Span	Mean	2.28	2.29		
Maximum score 7	SD	0.98	0.95	z= -.032	n.s.

Table 4:A cont. Summary of Baseline Measures.

Control Measures cont.

Visual Memory		N 25	N 24		
		Experimental	Control	Test Stat.	Probabality
Greek Letter, Visual-Sequential	Mean	2.08	1.88		
Memory Test. Maximum Score 12.	SD	1.91	1.73	z= -.453	n.s.
Alphabet Knowledge					
Recite Alphabet	Freq.	1 child (4%)	4 child. (17%)		
Letter Name Recognition	Mean	3.16	3.33		
Maximum score 26	SD	5.15	6.38	z= -.652	n.s.
Letter Name Recall	Mean	2.88	2.38		
Maximum score 26	SD	5.24	5.36	z= -.529	n.s.
Write Name	Freq.	2 child. (8%)	3 child. (13%)		
Write Letters in 1 minute	Mean	0.68	1.04		
Maximum score 26	SD	1.18	2.18	z= -.238	n.s.
Mathematics					
BAS Number Skills	Mean	6.48	6.58		
Maximum score 36	SD	4.96	4.83	z= -.171	n.s.

Table 4:B. Summary of Baseline Measures.

Experimental Measures.

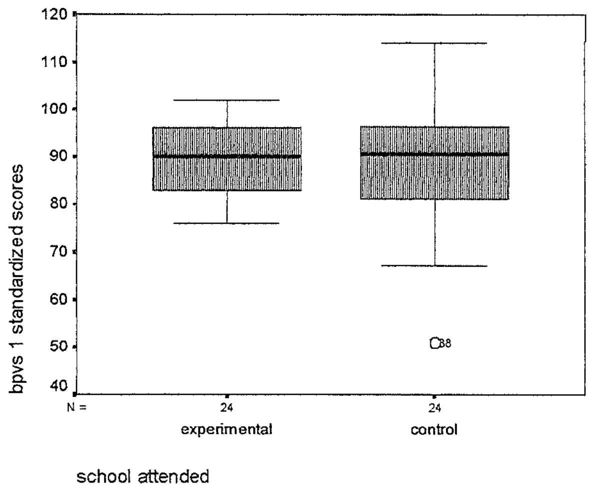
Phoneme Awareness		N 25	N 24		
		Experimental	Control	Test Stat.	Probabality
Initial Phoneme Identification	Mean	0.92	0.46		
Maximum score 24	SD	2.25	2.25	z= -1.580	n.s.
Phoneme Segmentation	Mean	0	0		
Maximum score 12	SD				
Phonic Knowledge					
Letter Sound Recognition	Mean	1.32	0.67		
Maximum score 26	SD	3.72	2.85	z= -.378	n.s.
Letter Sound Recall	Mean	0.48	4.17E -02		
Maximum score 44	SD	1.69	0.2	z= -.602	n.s.
Write Sounds	Mean	4.00E -02	0		
Maximum score 10	SD	0.2		z= -.980	n.s.
Reading					
Print Concepts	Mean	1.84	2.21		
Maximum score 24	SD	1.4	1.1	z= -1.429	n.s.
BAS Single Word Reading	Mean	0	0		
Maximum score 20	SD				
Young Reading Test	Freq.	3 child. (12%)	2 child. (9%)		
Achieved a reading age = 5/15					
Read Regular & Irreg. Words	Mean	0	0		
(non-standard) Maximum score 12	SD				
Read Non-Words	Mean	0	0		
(non-standard) Maximum score 10	SD				
Writing					
Write Regular & Irreg. Words	Mean	0	0		
Maximum score 10	SD				

The Results of the Baseline Control Measures.

Oral Language.

The scores on the **BPVS** (mean E =89.63, SD 7.73; mean C =88.75, SD 14.05; z=-.031, n.s.) for the children in both groups, was almost 1 standard deviation below the mean even when adjusted for the EAL norms. This probably reflects the impoverished environment from which most of the children came.

Figure 4:1. Baseline Measure of Oral Language. BPVS Standardised Scores.

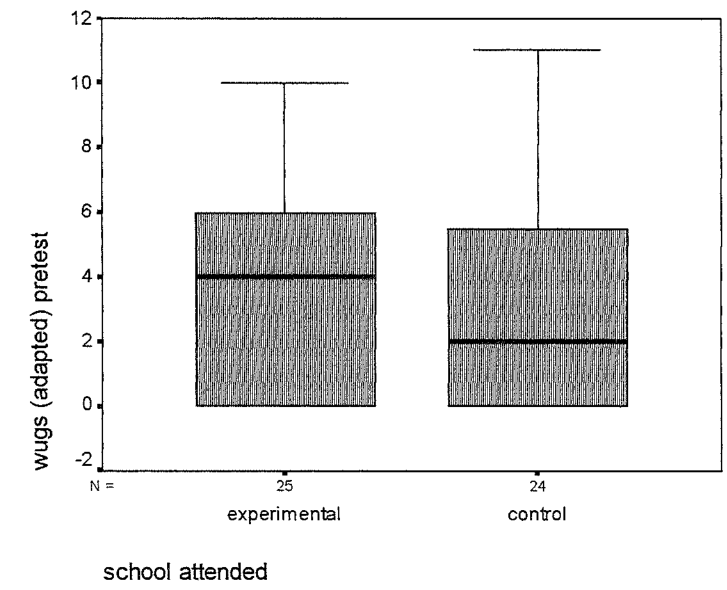


There is one missing score for the experimental school as one child, a very shy girl who had only just started at the school, refused to point to the pictures. It can be seen in the boxplot above (Figure 4:1) that while the median score for both groups was around 90, the spread of scores was greater for the control group. The outlying low score of 51 belonged to a (EAL) Nigerian boy who was extremely shy and withdrew from the task. Two of the higher scoring children in the control group, with scores of 110 and 114, were both (EAL) Asian boys whose parents were teachers in the school.

(Boxplots; The box itself represents the portion of the distribution falling between the 25th and 75th percentiles. The horizontal line across the interior of the box represents the median. If the median line is eccentrically placed within the box, a skewed distribution is indicated. The vertical lines outside the box connect the largest and smallest values that are not categorised as extreme values. An outlier is defined as a value more than 1.5 box lengths away and an extreme value as more than 3 box lengths away from the box).

The non-significant result for the test of **morphological awareness** (mean E = 3.56, SD 2.99; mean C = 3.13, SD 3.37; z=-.672, n.s.) also demonstrates that the two groups were well matched on the verbal language measures.

<u>**Figure 4:1a**. Baseline Measures of Oral Language. Morphological Awareness.</u>

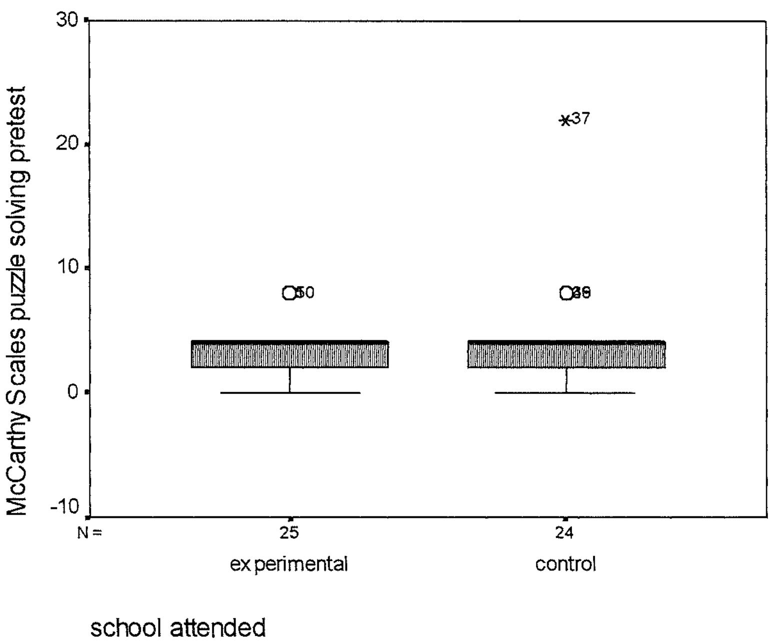


While most children's scores were low on this test only a few were at floor. Figure 4:1a shows that the median score for the experimental group was 4 and for the control group 2. However, the control group had several high scores including the highest score of both groups. Together these two tests of oral language show that although the differences between the groups are non-significant, the control school has a greater variation in the scores than the experimental school.

Non-Verbal Ability.

On the **non-verbal measure** there was a non-significant difference between the two groups, (mean E = 3.24, SD 1.94; mean C = 4.13, SD 4.34; z=-.708, n.s) who on average were able to complete 2, 2 piece jigsaws and a 3 piece jigsaw but ran into difficulty when confronted by 4 pieces.

<u>**Figure 4:2**. Baseline Test for Non-Verbal Ability. Puzzle Solving.</u>

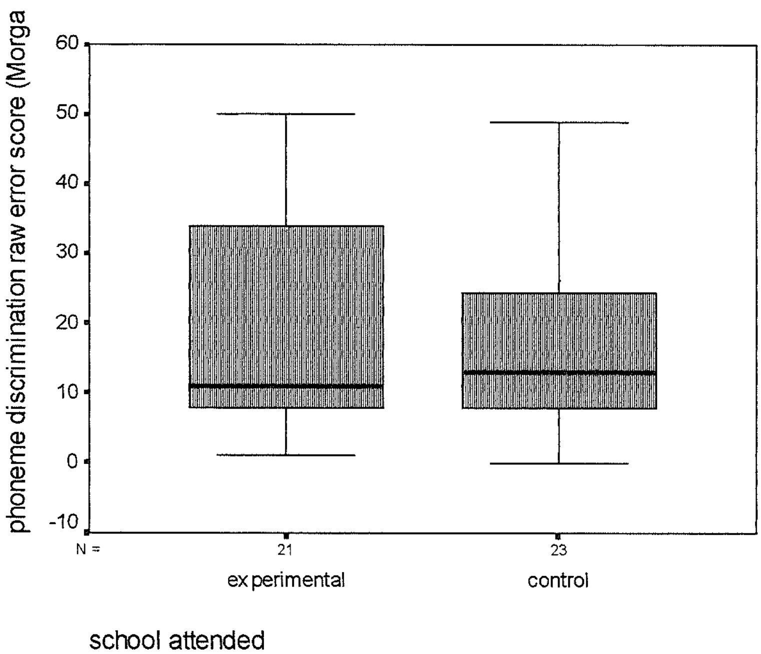


It can be seen in Figure 4:2 that the groups are well matched. The score at ceiling in the control group belongs to a girl who uniquely had no trouble at all completing all the puzzles.

Auditory Perception.

There were also non-significant results for both measures of auditory perception. The high error rate for both groups on the **auditory discrimination and attention test** appeared to be due more to an inability to concentrate on the repetitive task than to a lack of auditory discrimination. While some children could carry out the task at one sitting, others were only able to concentrate for a third or a half of the test at a time.

Figure 4:3. Baseline Measure of Auditory Discrimination & Attention.



The scores reflect the number of errors made by the children when deciding between two pictures in response to two similar spoken words, (e.g. 'tin' 'bin'), (mean E = 18.86, SD 15.94; mean C =17.39, SD 12.45; z=-.129, n.s.). Figure 3 shows that a few children in both groups made no errors at all, while the median number of errors for both groups was just over 10 and at the other end of the scale, a few in both groups made almost the maximum number of errors possible. Four children in the experimental group and 1 in the control group were too immature to carry out the task at all. Some children would simply point at any picture quickly to get the test over with and others would try and second-guess the word coming next, jabbing at a picture and then changing to the alternative one. However, most the children completed the task, one way or another, with little difference in approach between groups.

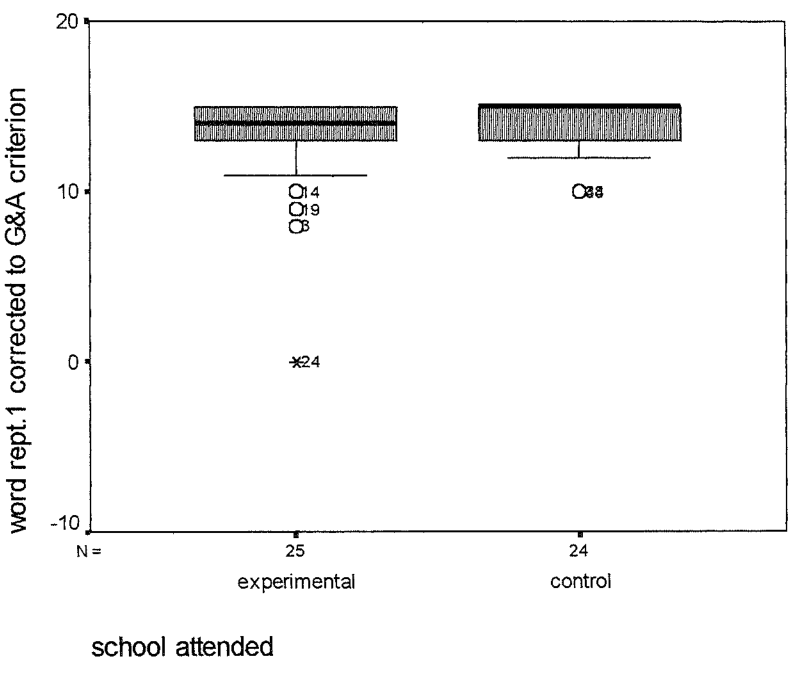
Phonological Awareness.

Only one child in each group was able to **detect rhyme**, despite 4 practice items. Most children responded with the same answer, either 'yes' or 'no' to all 12 items regardless of whether they rhymed or not.

Phonological Memory.

In the phonological memory tasks, the children did quite well in both **word and non-word repetition** although a number of the children were very shy and had to be coaxed into repeating the words after the experimenter. For several children in both groups the task was deferred to a following session.

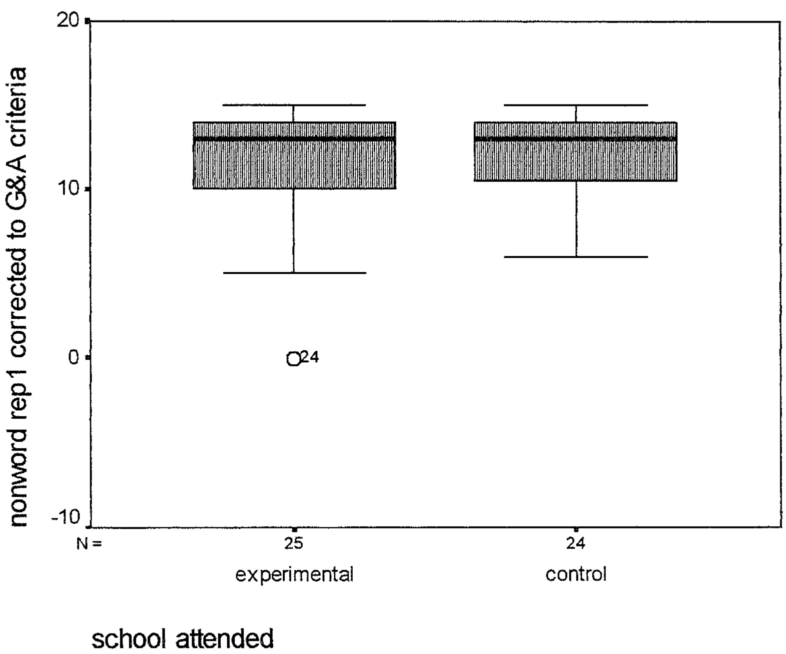
Figure 4:4. Baseline Test of Phonological Memory, Word Repetition.



For both word and non-word repetition there were no significant differences, for word (mean E = 12.96, SD 3.35; mean C = 13.88, SD 1.73; z=-1.215, n.s) and for non-word (mean E = 11.40, SD 3.65, mean C = 12.17, SD 2.60; z=-.527, n.s.), with the maximum possible score of 15 for each task. Figures 4:4 above and 4:4a below show that the experimental group was less homogenous than the control group with greater variation at the lower end in the word repetition task but the median scores for both groups on the non-word repetition task, were the same. This was due to interference from acquired mispronunciation of words in a child's vocabulary (e.g. mokerbike), i.e. faulty representation in the child's mental lexicon, whereas there was less interference for the non-words, the children simply repeated what they heard. There will be full discussion on this subject in Chapter 6.

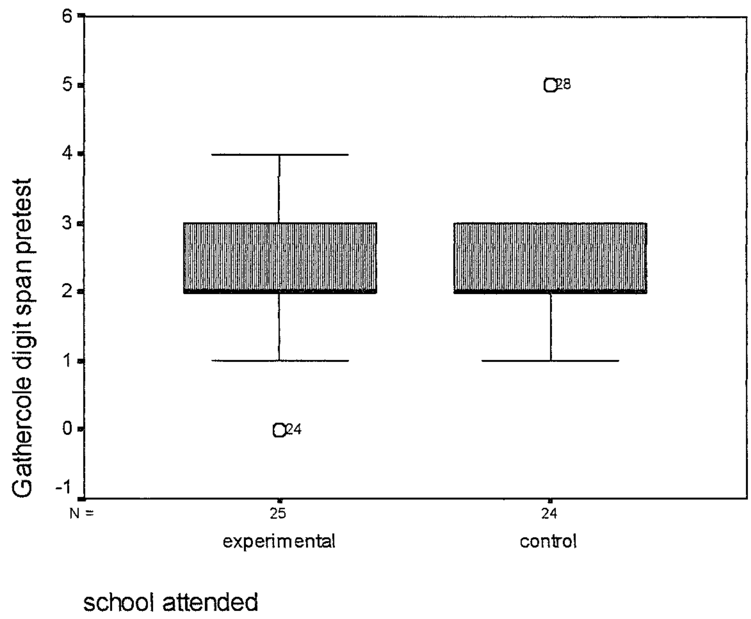
The child that Figures 4:4, 4:4a & 4:4b show at floor was the same child who refused to do the BPVS, painfully shy she only muttered in response or refused to repeat the words for both the word and non-word repetition tasks and the numbers for the digit span task, so the tests were discontinued.

Figure 4:4a. Baseline Test of Phonological Memory. Non-Word Repetition.



In the **digit span** task, the children on average could repeat a pair of 2 numbers and a pair of 3 numbers and some children a pair of 4 numbers (mean E = 2.28, SD .98; mean C = 2.29, SD .95; z=-.032, n.s.). In general the children were less embarrassed to repeat numbers than words. Figure 4:4b shows that the groups were well matched on this task with 3 children in the experimental group able to repeat a string of two sets of 5 digits, one digit longer than the rest of the children in both groups except for one child in the control group who was able to repeat two sets of 6 digits. Her class teacher suggested that this could be due to the fact that the girl of Nigerian origin, had returned to Nigeria for 3 months schooling in which, according to the child's Mother, there was a lot of rote learning and repetition.

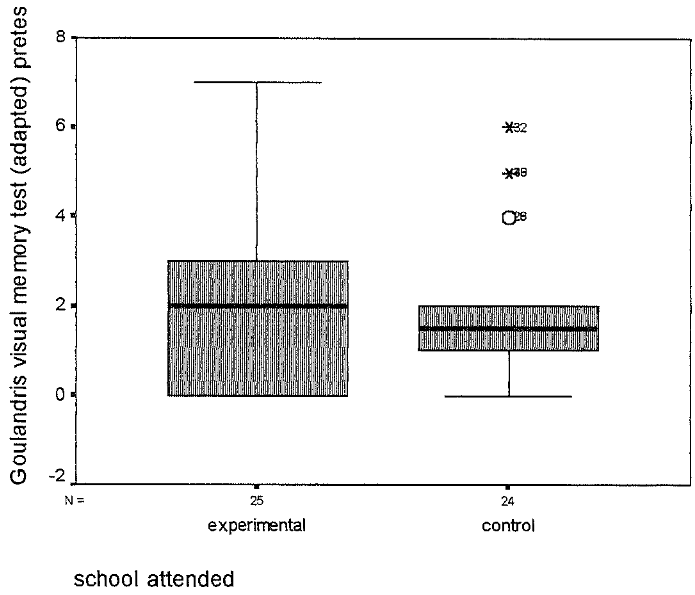
Figure 4:4b. Baseline Measure of Phonological Memory. Digit Span.



Visual Memory.

The were no significant differences in the **visual memory** task, children could on average, remember at least the first set of two Greek letter shapes and the order in which they were presented but after the first set it became more difficult to remember the order, and not many children could remember more than 3 Greek letters (mean E = 2.08, SD 1.91; mean C = 1.88, SD 1.73; $z=-.453$, n.s.). However, Figure 4:5 shows that a few children in each group had a total score of between 5 and 7 out of a potential of 12 for letter identification and correct order. The experimental group showed greater variation with more children at floor than the control group. As children carried out the task they would often remark on the similarity of a letter to a letter in their name, *epsilon* and *tau* were favourites.

Figure 4:5. Baseline Measure of Visual Memory.

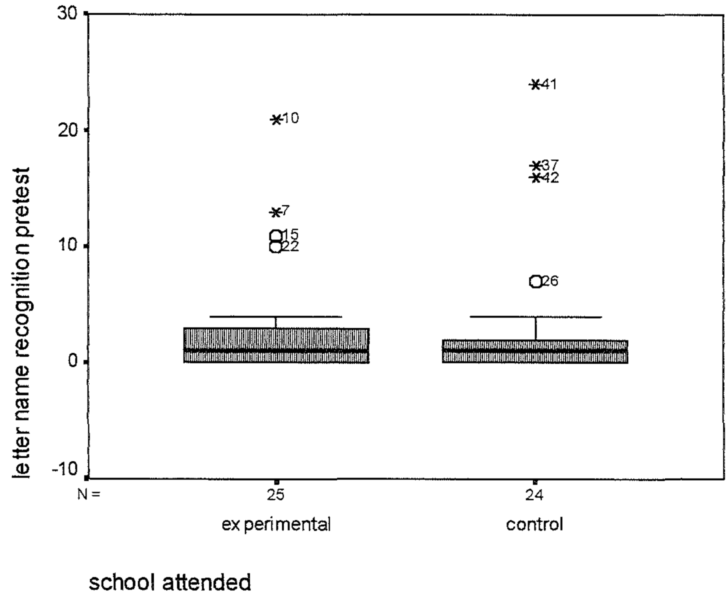


Alphabet Knowledge.

As a baseline measure only, the children were asked to **recite the alphabet**. Only 1 child in the experimental group was able recite all 26 letters in order and 4 children in the control group. Several others in the control sang an alphabet song but got the letters confused.

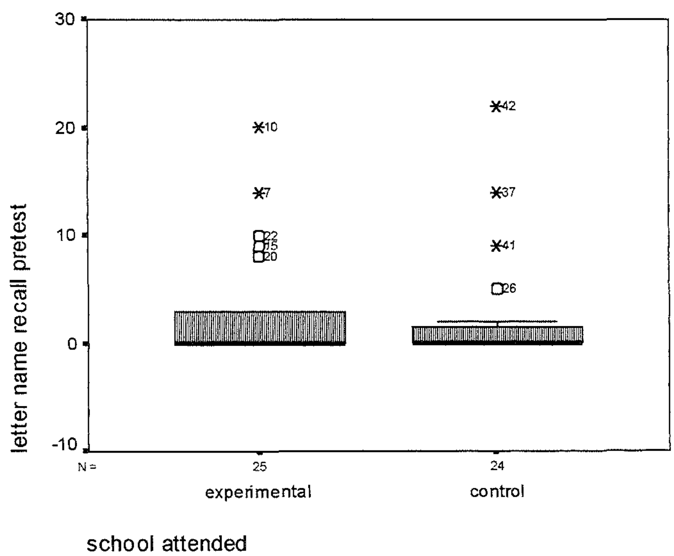
Most of the children that could **recognise or recall the names of letters**, seemed to do so on the basis of the letter 'being for' their own or a friends name and knew on average 2 or 3 letters. For letter name recognition (mean E = 3.16, SD5.15; mean C = 3.33, SD6.38; z=-.652, n.s.) and for letter name recall (mean E = 2.88, SD 5.24; mean C = 2.38, SD 5.38; z=-.529, n.s.).

Figure 4:6. Baseline Measure of Alphabet Knowledge. Letter Name Recognition.



Figures 4:6 & 4:6a show that 4 or 5 children in each group had learnt more than a few salient letters. The high scorer, in the control group, on the recognition task was one of the boys with an above average BPVS and the high scorer on the recall task was the other.

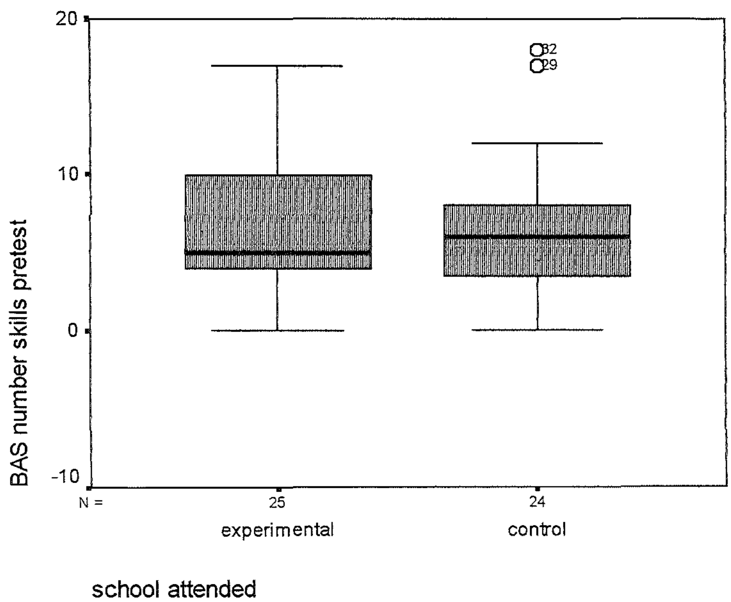
Figure 4:6a. Baseline measure of Alphabet Knowledge. Letter Name Recall.



Two children in the experimental group and 3 children in the control group could **write their name**, but most children, on being asked to write their name, earnestly made squiggles or small circles in the box provided. Similar scribble or letter-like hieroglyphics, that occasionally included a real letter, were written in the box provided for **writing letters**. The few children who wrote letters, range of 0-4 in experimental group and 0-7 in control group, (mean E = .68, SD 1.18; mean C = 1.04, SD 2.18; z=-.238, n.s.) usually did so because they wrote the letters in their name. Few of the children held the pen in an appropriate manner as most clutched it like a wooden spoon or a shovel. Several children in both groups wrote letters backwards and worked from right to left. In fact one child in the experimental school who was able to write her name, wrote it backward on the score sheet.

Number Skills.

Figure 4:7. Baseline Measure of Number Skills.



The final control measure, was the **BAS Number Skills** and Figure 4:7 demonstrated a further good match between the experimental and control groups (mean E = 6.48, SD

4.96; mean C = 6.58, SD 4.83; z=-.171, n.s.). The average child had only the very simplest notion about number and it was quite difficult for them, for example, to distinguish between groups of two, three and four tomatoes.

The Results of the Baseline Experimental Measures.

Phoneme Awareness.

Most children in both groups were unable to **identify the initial phoneme** of the 24 words in the test. Responses ranged from repeating the whole word, through pronouncing the first accompanying vowel (e.g. /co/ for coat) or the first syllable (/un/ for onion), to pronouncing an arbitrary sound (mean E = .92, SD 2.25; mean C = .46, SD 2.25; z=-1.580, n.s.).

Figure 4:8. Baseline Measure of Initial Phoneme Identification.

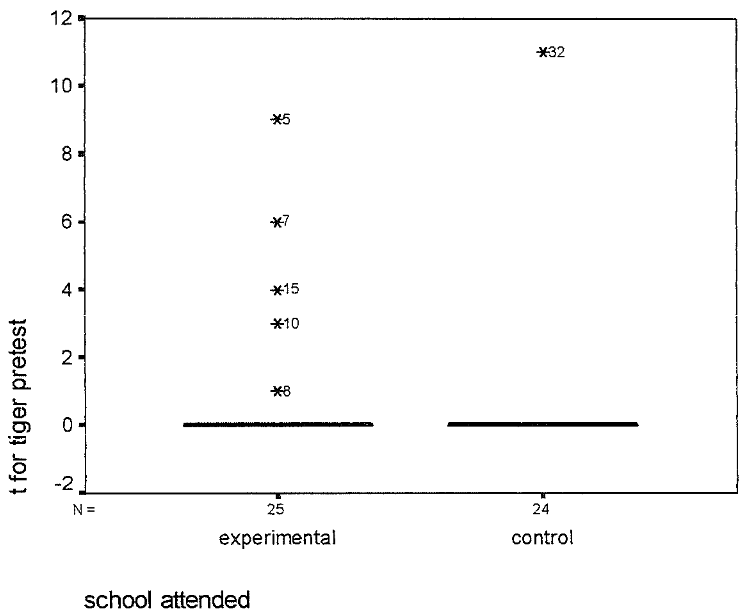


Figure 4:8 demonstrates the floor effects on this task with only 5 children in the experimental group able to attempt the task and one child in the control group scoring almost half correct.

The other phoneme awareness measure, **phoneme segmentation**, was completely beyond the ability of any of the children. The typical response was to repeat the whole word two or three times while expanding the gap between their hands, *spot, spot, spot*, etc. or alternatively stare uncomprehendingly at the experimenter while she made inexplicable sounds and gestures.

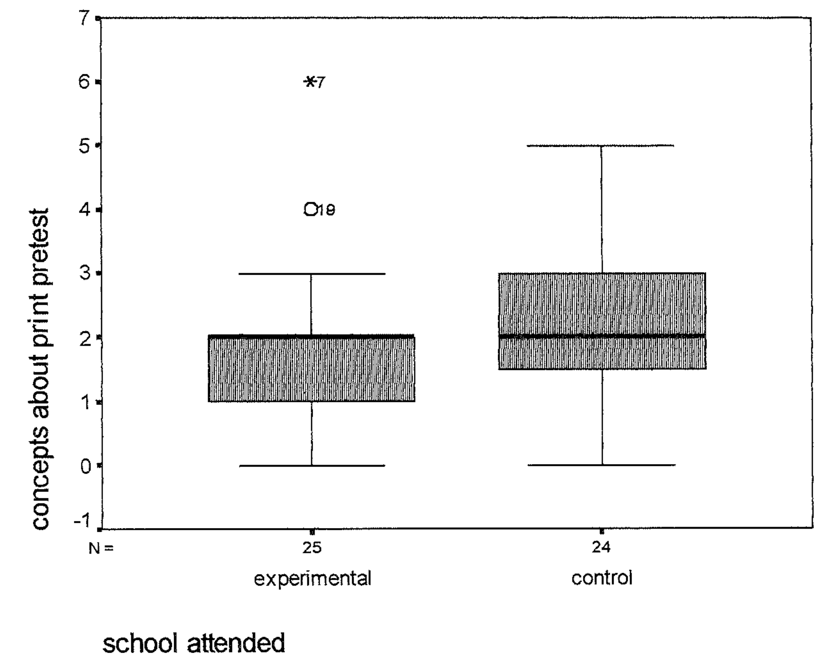
Phonic Knowledge.

For all three measures of phonic knowledge, the majority of children were at floor. Two of the children in the experimental group who knew more than half the letter names also **recognised** half the **letter sounds**. Similarly, one child in the control group who knew more than half the letter names, recognised 14 letter sounds (mean E = 1.32, SD 3.72; mean C = .67, SD 2.85; z=-.378, n.s.). However, even these 3 children were unable to **recall** more than a handful of **letter sounds** (mean E = .48, SD 1.69; mean C = 4.00E-02, SD .2; z=-.602, n.s.).

Only one child in the experimental group was able to **write 1 sound**, the remainder in both groups were at floor.

Reading.

Figure 4:9. Baseline Measures of Print Concepts.



Few children in either group had many concepts about books, print or stories (mean E = 1.84, SD 1.4; mean C = 2.21, SD 1.1; z=-1.429, n.s.). The low average for scores on the Clay **Concepts about Print Test** revealed that few children were aware of much more than the front of the book or whether or not it was upside down.

Figure 4:9 shows that the median score for both groups was 2 with several children at floor. The range for the experimental group was between 0 and 3 with two outliers scoring 4 and 6 (out of 24) and for the control group the range was between 0 and 5. Many children in both groups tried to mess the book up, not understanding what it was for.

Most children successfully circled one of the 3-5 words that were candidates to correspond with a picture, in the **Young's Reading Test**. Some circled all the words but only 3 experimental and 2 control children circled 5 or 6 words correctly (out of 15), giving them a 'reading age' of 5 years. The children who were successful in this task were not the same few children who scored on alphabet or letter sound knowledge.

The remaining reading and writing tasks, i.e. **BAS reading, read regular and irregular words, read non-words, and write regular and irregular words,** were completely at floor for both groups, as can be seen in Table 4:B.

With two such evenly matched groups it may be expected that at the end of the study, any effects of the intervention will be specific to the experimental measures and the differences between the groups for the control measures may be expected to remain non-significant.

Chapter 5

The Intervention Study.

The Schools.

As stated in Chapter 4, children involved in the present study attended two south London primary schools that had their own early years units. Both schools drew their pupils from similar high rise, low socio-economic council estates with a proportion of the early-years children having previously attended social service day care centres. The experimental school had been without a permanent head teacher for some time but he arrived in the same term that the baseline data for this study was collected. The head teacher of the control school had in her own words, 'turned the school around' when she had arrived two years before.

The Nurseries.

Experimental.

Of the two schools chosen for this study, the experimental school was chosen for the intervention because, in spite of the fact that the nursery teacher herself adopted a whole language, anti skills and drills approach, this was not a philosophy of the school as a whole, as it was with the control school. It was anticipated therefore, that if the teacher herself would support the intervention, it would be generally acceptable within the school.

When the experimental nursery teacher initially agreed to allow the intervention to take place in her nursery, she was sceptical and uneasy about the nature of the intervention as she had deeply held 'child centred' views. She believed that teachers should be alert to when a child was ready to learn a new skill and then capitalise on the child's interest to take them forward, but should not impose a skill on a child before that interest had naturally developed or before they were ready. The nursery was very organised with small groups of children rotating round the various activities and it opened onto a garden with apparatus and opportunities for free play. There was a white magnetic board with magnetic letters available but it was only occasionally used. Whole words were written on cards and placed near a novel item (e.g. 'Snail' for snails collected from the garden) and sentences were written under the children's exhibited art work (e.g. Harry's new car). Spaces were cleared for the children to sit quietly in two groups (full & part-time) and listen to a story every morning and afternoon. The teacher explained that these particular children had a tough enough job just learning to interact with other children and cope with the very basic requirements of nursery school, without the stress of having the complexities of written language thrust upon them. She disliked the idea of 'work sheets', doubted the viability of 'a whole class' activity at this age and was convinced that digraphs would be totally beyond the reach of 3 to 4 year olds. In spite of this, she agreed to support the intervention activity by sitting with the children and encouraging them to listen and respond. However, she was offered a better job and left before the intervention started. Unfortunately, there was no permanent class teacher throughout the term of the intervention and to a significant extent classroom practices broke down under the management of two stressed nursery assistants who resented the better paid but inadequate intermittent supply teachers, who only ever lasted for a few days anyway. This led to a less than ideal atmosphere for the intervention activity as the assistants took the opportunity to have a break in a separate part of the room, leaving the experimenter, who is not a teacher, on her own with up to 30 children. They did eventually become interested as the programme progressed and agreed to help organise the children for writing practice at the end of the session. The reception class teachers came in to watch the 'whole class' event and remarked that, even if all the children learnt was to sit still for 10 minutes, it would be an improvement on the current year.

Homework sheets were supplied for each day but as the experimenter was not there when the children went home, they were rarely given out. When the new teacher arrived in the last week of the intervention she was anxious to get the nursery back into shape. Therefore, the intervention came to an abrupt end and the last two or three gpc's were not properly introduced. A final session was allowed but the teacher selected a handful of children for the experimenter to take into the library. However, the teacher accompanied the group and was so impressed with the session that she was sincerely sorry that she had not taken part in the intervention study and that it had to end this way. The contracts of the two nursery assistants were terminated and a new regime was installed.

Control.

The overall focus of the control school was on 'whole language' and 'real books'. The corridor of the early years unit was lined with large hand written copies of Liz Waterland's suggestions for posters and letters of advice for teachers to give parents, taken from her booklet 'The Apprenticeship Approach' reviewed in Chapter 2.

A highly regarded teacher who had run the nursery for 12 years was interested and enthusiastic to play a part in the study. The nursery class was very similar to the experimental class with various activity areas and access to a play area and garden outside. The story corner, which the teacher regarded as the heart of the nursery, was a large comfortable area, created by the use of bookshelves, window seats and lots of large colourful cushions, fabrics and posters. There were two nursery assistants who had both been at the school for several years and one of them was on a course for a further qualification. The experimenter called regularly at the control nursery, while she was carrying out the intervention in the experimental nursery, to become familiar to the children and join in with their activities.

Intervention Design.

The intervention was carried out for approximately 10 minutes every day over a period of eight weeks, in the second term of nursery school, from January to March 1998. The experimenter was in the classroom each morning as the children arrived and behaved like any other teacher organising worksheets and setting out the area to be used for the whole class instruction. Large wooden blocks were utilised for the children to sit in three tiers facing the experimenter.

From 9am to 10am, the nursery staff assigned the children to various activities in small groups. The intervention activity was timed to begin at 10am immediately before playtime so that the children could 'let off steam' immediately after a period of sitting still and concentrating. As they finished their various activities the majority of the children routinely drifted over to the intervention area and either helped to finish setting up the wooden blocks or to lay out pencils for the work sheets on the tables or simply found themselves a place on the tiers of blocks and waited to begin. The remainder of the children came and fitted into the spaces when called at 10 o'clock. Except for the odd occasion when the experimenter had to ask a nursery nurse to sit near an unhappy or disruptive child, she carried out the instruction without any other assistance or adult present. The children were introduced to a new grapheme-phoneme correspondence each day with no expectation or pressure for them to learn it. The objective was to model the process of written language by demonstrating that the letters can be put together to 'say' anything a person can say. The approach was designed as an error free, interactive game and no single child was asked to supply an answer. No child was ever reprimanded during a session and potentially disruptive children were kept occupied by either holding the picture book, having a turn at placing the full stop at the end of the sentence, handing out badges or simply sitting on the experimenter's lap. However, the fast pace, the variety and short length of each session was such that most of the children remained fully engaged. Immediately after practising to write a new letter the children were free to go out to play.

The intervention concentrated on inducing awareness of phonemes, and of the alphabetic principle i.e. that written letters represent speech sounds. This contrasts sharply with the 'whole language' approach taken in the control nursery, which is described in detail below.

The Control Nursery's Reading Development Approach.

The control nursery teacher outlined her approach to literacy as follows:

The story corner is the heart of the classroom in which the children learn to listen attentively and talk about their experiences. A growing use of vocabulary and an increasing fluency to express thoughts that convey meaning to the listener is encouraged. The children listen and respond to stories, songs, nursery rhymes and poems as well as making up their own stories and taking part in role play. They learn to handle books carefully and understand how they are organised. They learn that words and pictures carry meaning and that English print is read from left to right and from top to bottom. They begin to associate sounds, with patterns in rhymes, with syllables, and with words and letters. They learn to recognise their own names and some familiar words. They learn to recognise letters of the alphabet by shape and sound (names). In their writing they are encouraged to use pictures, symbols, familiar words and letters, to communicate meaning, showing awareness of some of the different purposes of writing. They learn to write their names with appropriate use of upper and lower case letters.

The greatest emphasis is placed on the enjoyment of books by making story telling exciting and an activity that children will want to participate in. Early reading strategies are developed through a wide range of reading experiences using a range of core books (*Pathways* Stage 0) that offer valuable support for the beginning reader, by providing:

- Patterned texts with repeating plot patterns.
- Repetition of familiar words and phrases to aid word identification and word recognition.
- Texts which encourage contextual understanding.
- Picture cues giving opportunities for prediction and the discussion of subject matter and ideas in the text.
- Opportunities to introduce and encourage finger pointing, following from left to right, and joining in.
- Rhyme, rhythm and alliteration.
- Texts which concentrate on the alphabet, and alphabetical order.
- The introduction of a wide range of genres appropriate to young readers is an important element. Genres include narrative (both fantasy stories and those within the child's own experience); instructional texts, information texts, wordless texts, rhyming texts, a counting text and an ABC.
- The relationship between print and pictures enables children to develop their understanding of meaning and ideas and to relate them to the written words. Specifically excluded in the nursery, viewed as more suitable for the Reception class, are sound-symbol correspondences and phonological awareness, the recognition of initial sounds or two and three letter combinations.

Daily activities include:

- Daily stories, songs and rhymes.
- Story-corner available all the time and children encouraged to 'read' favourite books.
- Name cards - for jobs etc., in story corner and for writing, in writing area.
- Alphabet letters in name card pockets.
- Sound lotto.
- I spy games.
- Read alphabet books.
- Rereading favourite books and learning them.
- Weekly drawing and writing sessions, with children encouraged to 'have a go'.
- Writing patterns.
- Talking about rhyming words, especially in books and songs.
- Using magnetic board with letters and pictures from stories.
- Making plasticine letters.

Intervention Paradigm for the Experimental School.

Prior to the Jolly Phonics commercial reading programme, designed by Sue Lloyd and published by Jolly Learning (1992), becoming known in the UK, the design for this study was in the process of development.

A set of 44 phonemes was sequenced to present all the vowels within the first 10 items and in such a way to as to permit words to be blended as soon as possible. An artist was commissioned to illustrate the stories being designed to isolate the phoneme in a memorable way with an accompanying action. Finally, 2 sets of words were being developed: one phoneme awareness set for auditory and oral practice and another, accumulative set for visual encoding, which would only include phonemes that had been previously learned.

However, practicality triumphed over originality and the Jolly Phonics programme was adopted. It offered a ready-made, high quality colourful wall frieze containing pictures that illustrated the 40+ phonemes as well as matching sets of work sheets with letter templates for writing practice that were very similar to the materials being developed for this study (Ideas are in the air).

However, although the JP phoneme presentation order was adopted to synchronise with the wall frieze, subtle adaptations and additions were made to the JP approach for this study. The JP programme has a wide range of materials giving teachers and parents maximum flexibility, within the general approach, to teach children to read to a competent level. The purpose of this study, however, was to investigate whether early introduction to grapheme-phoneme correspondences and the alphabetic principle would be sufficient to trigger a self-teaching mechanism, providing less advantaged children with the skills that their more advantaged peers arrive with at school.

For example, the JP approach suggests that teachers extemporise a story round the pictures that represent the phonemes on the frieze, whereas, for this study, interactive, alliterative stories were devised and *read* giving the children the opportunity to practise the phonemes and the reinforcing actions, inspired by the phoneme illustration, that accompanies them. The rational for reading rather than extemporising the story was threefold: firstly, for experimental control and possible replication of the study, secondly, to standardised the style and pace of the stories across all the phonemes and finally, and most importantly, to model *reading* the story that is illustrated in the picture, from a book.

However, the main difference between the JP approach and the one proposed here, was that the written words that were introduced to the children for segmentation and blending, only included the phoneme which was currently being introduced and phonemes that had been previously introduced. (A full explanation will be found in the procedure section). And finally, the JP approach was initially devised for school-aged children but this intervention was to be carried out with nursery children in a whole class setting.

For this reason, a rapid pace needed to be maintained within a very short time frame, in order to hold the children's interest and to forestall the possibility of exceeding their attention span.

Materials.

The materials drawn from the JP reading scheme were as follows:

1) A wall frieze, representing 42 of the grapheme-phoneme correspondences in English, with 23 single letters of the alphabet in capitals and lower case and 18 digraphs in lower case only (the digraphs /ck/ and /qu/ replaced the missing single alphabetic letters of c, k, and q). Each of the 42 phonemes was supported by a picture that could be used as a basis for a story and each story gave rise to an action appropriate to the phoneme (eg. A Spanish dancer clicking castanets for /ck/).
2) A set of seven finger-phonics books, augmenting the pictures in the frieze with the addition of a tactile letter shape for tracing around with a finger.
3) A set of worksheets, containing dotted letter shapes, were photocopied from a set of seven phonics workbooks.

The materials designed specifically for the intervention were as follows:

In addition to the JP materials, 39 alliterative stories were written especially for the intervention and compiled into a book, to describe the wall frieze pictures. Also 2 sets of words were compiled to accompany each story, one for oral phonological awareness practice and the other for visual encoding, i.e. segmenting and blending written words; the second set included only the phonemes learned thus far plus each additional new phoneme.

The 39 stories devised for this study, with their corresponding word lists, can be found in Appendix 3.

A Jolly Phonics wall frieze was permanently fixed to an adjacent wall easily visible to all the children. (Another was fixed to the window onto the garden for the parents to see as they waited for their children after school).

The letters on the frieze were organised into 2 blocks as follows:

<u>Block 1.</u>

1. s, a, t, i, p, n
2. ck, e, h, r, m, d
3. g, o, u, l, f, b

<u>Block 2.</u>

4. ai, j, oa, ie, ee, or
5. z, w, ng, v, short oo, long oo
6. y, x, ch, sh, voiced th, unvoiced th
7. qu, ou, oi, ue, er, ar

Procedure

During the first three intervention sessions, a letter name and sound was taught accompanied by a story and an action generated from the story. Words beginning with this sound were generated and discussed. The shape of the letter was traced in the air with a finger. The children had an opportunity to trace round the letter shape in a finger phonics book. They then practised tracing round dotted letter shapes on a work sheet.

After the first three days, the format for each intervention session was as follows:

1. Some of the previous letter names and sounds are revised at random with the appropriate action, pointing to the capital letter for the letter name and the low case letter for the sound, ending with a letter that was introduced the previous day.
2. Words beginning with or containing the previous day's letter are generated, including the names of any children who received a badge that day, with the first grapheme in their name on it.

3. The children are asked to help write a word or a story (maybe just of two words and only including previously learned gpc's). The story is suggested and the experimenter offers to do the actions if the children will say the sounds. The 'story' is written on the black or white board and each phoneme is pronounced as it is written. A full stop or a question mark where appropriate, is added at the end.
4. The children read the 'story' with the experimenter as she points to the words.
5. The experimenter then introduces a new letter name, sound and action.
6. And awards a badge to children whose name begins with that phoneme.
7. Then reads the story for the new letter, which involves lots of action practice.

The children practise tracing round dotted templates on a work sheet.

Rational for the Procedure.

In the first few sessions, after a few minutes revision, the new phoneme was introduced followed by the story, so that only one phoneme was practised per session. However, it was quickly realised that learning a new phoneme and listening to the story required too much concentration to then practise segmenting and blending words. The procedure therefore developed naturally into beginning with the blending and segmenting practice of the previous day's phoneme and ending with the new phoneme and the story.

Typical Intervention Procedure; the second week, learning /n/, introducing /ck/.

The session begins with revision of some previous gpc's, (s, a, t, i, p, have been learnt so far and /n/ has been introduced). The teacher (experimenter) asks, "Are you all sitting comfortably? Are you ready?" Then setting off at a brisk pace, "OK, what does this letter sound like?" Pointing to /s/, (the best known letter-sound) and making the hand movement like a snake. "And what's its name?" pointing to the capital letter. The teacher always supplies the letter name or sound or gives a clue with the action if, after a beat, it is not forthcoming from the class. "Well done, and what does this one sound like?" pointing to the /a/, and making the action of brushing an ant off the arm. "Excellent, and the name of this one is 'P'," pointing to the capital 'P', "and it sounds like....?" pointing to the low case letter on the frieze " and after a beat, "/p/" making a small plosive sound with the lips, like blowing out a candle. "Brilliant, you know them all". All phonemes are pronounced precisely, taking care not add a schwa (/p/ as opposed to /per/). "Now, can anyone remember this one that we learnt last time?" Pointing to /n/. and making the action of a noisy toy plane that goes n,n,n,n,n as it flies around. "/n/ yes, do you remember the noisy little toy plane that all the children ran after going n n n n n?" "Well, that's amazing you've remembered all the names of the letters and all the sounds they make, aren't you clever?" Segmenting and blending techniques are practised as soon as the first 3 or 4 letters have been learnt. A spoken word is pronounced very slowly and as the children learn to isolate and supply each phoneme, the experimenter writes the corresponding grapheme on the board. The written letters are then blended back together to pronounce the word as follows:

"Ok, so will you all help me to write a story? Now, shall we write 'ant' for Ali ant because that's got a /n/ in it, or shall we just write 'Pat' for postman Pat again?" These words are taken from a list of words that had been compiled to include the latest phoneme, in this case /n/, and the ones that had gone before in this case s,a,t,i,p. So the list included words like, *sat, sit, at, is, in, a, tip, pin, tap, Stan, pit, nap, tan,* etc. or stories like '*Ants in a tin' or 'Stan's (*the snake*) in a pit'.* The children choose 'ant', "OK, let's write 'ant', now, I'll do the actions and you tell me what sounds to write. What sound do we need to start writing *ant?"* (spoken very slowly /aaa...nnn..t/) "I think we need a (action of brushing an ant off Alison's arm, without the sound, and children respond with the sound) "Yes, that's it, we need an /a/ ". The children are then encouraged in the same way to call out the next sound and the corresponding letter is written on the board ("Now we need a /a....**nnnn**.t/" - action from the story of the noisy toy plane and children respond with the sound /n/) and finally "Excellent now we've got aaannnnn and now all we need is" action of a tennis game as the ball hits a racquet one side then the other, and the children instantly respond with /t/. "YES, well done you've made 'ant', see, aaannnttt, and all it needs now is a full stop, who'd like to put the full stop at the end? Now, lets all read it together" running a pointer along under the word, "'ant'. Excellent, give yourselves a clap". On the rare occasion when nobody responds, the teacher quickly supplies the sound, as the objective is to model the process of written language not to tax the children or test their knowledge. As the children start to generate their own words, hot favourites such as *bum* and *poo* are printed with equal seriousness on the board ("is that a long /oo/ like *spoon* or a short /oo/ like *book*?), accompanied by giggles of delight and the children's attention is then moved swiftly on. If by chance two words that rhyme are generated together, this is brought to the children's attention, "*Bum* sounds a bit like *tum* doesn't it? *Bum/tum*, they rhyme don't they?" By the end of the second week the children help write a 'story', such as "*Dad has a red hat*". The sentences always start with a capital letter, as do proper names and this was verbalised with minimum explanation e.g. "We'll put a capital 'D' because people's names are very important or, "We'll start with a capital letter because this is the beginning". In the same way each sentence also finishes with a full stop or a question mark e.g. "And what do we put at the end of a sentence? We put a ..... yes, (altogether) a full stop". A child is then chosen for the highly prized job of adding a full stop or question mark to the end of the sentence with the marker pen or chalk. The group then 'reads' the 'story' out loud as each word is pointed out. They are then told they are all extremely clever and should give themselves a clap, which they do (and never forget to do even if the teacher does!).

A new letter is then introduced, "This is the letter we are going to practise tomorrow, it's a tricky one because there are two that sound the same, this sounds like /c/, a curly /c/ and this sounds like /k/ a kicking /k/ and sometimes they go together and they still sound like /ck/. They make a sound like castanets, can you see this Spanish dancer playing the castanets, they go /ck/, /ck/, /ck/," (with the action of clicking the fingers over the head). Then the children are asked if someone in the class has a name beginning with that sound, if so, the child receives a badge with the grapheme printed on it. This relaxes the atmosphere after they have been working hard and concentrating. For the letter 'K' there is a 'Katie' who comes forward to collect the badge. Sometimes the children recognise a new sound and want to tell the teacher about it "My brother's got a /k/ 'cos he's Kevin" or like Harry in the following week, "Hey, Liz, I know 'O', it's for my Gran". When asked how was that, he replied proudly, "0181, that's my Gran's number". The children are then settled down again for the story, "Shall we all sit quietly now and listen to the story about the sound /ck/ and how Katie goes to dance for the King, clicking her castanets?"

In preference to simply *telling* the story of the letter-picture on the frieze, a positive decision was taken to follow the new letter practice by *reading* an alliterative story from a book, as this made a direct connection between the letters and reading. A full story was written for each sound but could be shortened if the children became restless. As the teacher reads the story, a volunteer from the class holds up the finger phonics picture book for the class to see the story in picture form. Throughout the short story, several occasions arise which prompt the children to practise the sound /ck/ by clicking their fingers like castanets. As well as aiming to fix the sound and action in memory the repetitive action is also aimed at capturing the attention of the youngest or least engaged children during the story.

Finally, the children then move over to the tables and are helped to find the worksheet with their name on and to practise writing the day's new letter or digraph, /c/, /k/by tracing round dotted shapes. They have an opportunity on the way to feel and be encouraged to form the letter correctly on the large tactile letter shapes in the finger phonics book. (Christopher was overheard to remark "This one must be the mother"). The whole process is conducted at a fairly rapid pace, with lots of fun and interaction, leaving no time for boredom or disruption and usually takes between 6 to 10 minutes, to a maximum of 15 minutes on good day when the children are calm and attentive throughout the session.

Final Session.

When the intervention was brought to an abrupt end with arrival of the new teacher, a final session was taken in the library with 8 children, chosen by the teacher, one of whom was not well enough to join in. The last few days of the intervention were scheduled to include lots of revision, however, without the wall frieze available in the library it was decided to photocopy an available worksheet and collect some final data on the children's ability to write words.

A sheet with 9 pictures representing simple CVC words like *cat* was provided for each child. Under each picture there was a space to write the word corresponding to the picture. The experimenter explained that the first picture was a hen, and, "What sound do we need to start writing /hhhhh e n/? We need a /h/", making the action of being 'puffed out' after running, breathing onto the hand in front of the mouth. Some of the children immediately started to write /h/ before it was written on the board, others were reminded by seeing it written and copied it onto their sheet. One of the children set about sounding out the words and writing them on his own while the rest stayed with the experimenter, either writing to the sound or copying the letters as they were written on the board. Four words were about the limit of the children's concentration, so the experimenter suggested that they only need write the rest if they wanted to but asked if they would help do the sounds anyway, for the children who did want to write the words.

Table 5:3 shows the number of correct words written by the children. The highlighted letters were either incorrect for the word or incorrectly formed. A sample work sheet can be found in Appendix 4.

Table 5:3. Results of final session with 7 children in the library.

Target word	hen	pen	net	hat	rat	cap	man	mat	cat	correct
Jake 4yrs 0m	hen	pen	**not**	hat	rat	cap	man	mat	**tat**	7
Hannah 4yrs 1m	hen	pen	net	hat	rat	**hat**	man		**cakt**	6
Jade 4yrs 1m	hen	pen	net	hat						4
Michelle 4yrs 5m	hen	pen	**met**	hat					cat	3
Reiss 4yrs 5m	**beh**	pen	net		ret	hat				3
Natasha 4yrs 0m			net				HEN			2
Jaide 4yrs 0m					**Djoi**					0

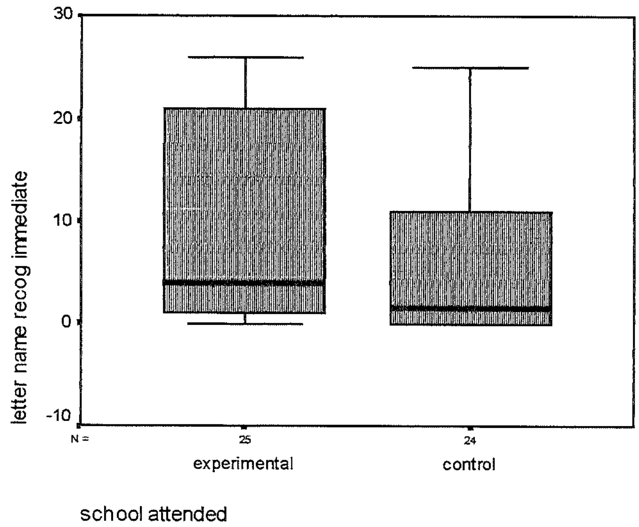
Immediate Post Tests.

Immediate post-tests were carried out in both schools at the end of the intervention, for letter name and sound recognition and recall. The results were as follows:

Letter name recognition and recall.

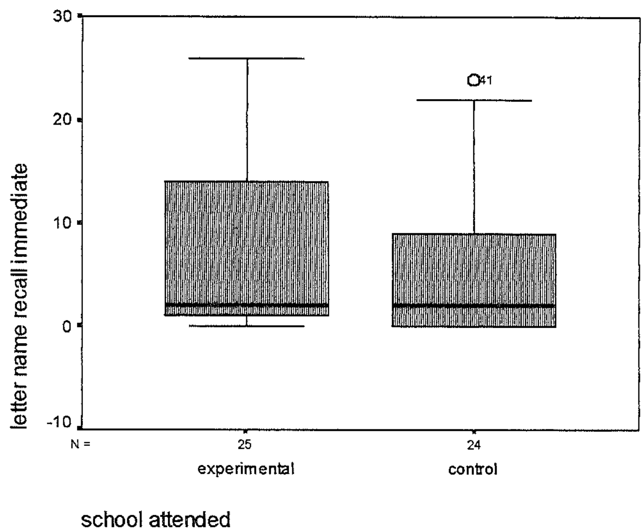
Figure 5:10 illustrates that although there were no significant differences between the two groups in their ability to point to a printed letter in response to its name, there was a greater spread of scores for the experimental children than the controls (mean E = 9.48, SD 9.93; mean C = 5.92, SD 8.45; z=-1.558, n.s). And although half the children in both groups had very low scores more of the control children were at floor.

Figure 5:10. Immediate post-test of letter name recognition.



The boxplot in Figure 5:10a also demonstrates a greater spread of scores for the experimental group in letter name recall, with fewer at floor than the control group, although these differences are not significant (mean E = 7.32, SD 9.53; mean C = 5.54, SD 7.60; z=-.598, n.s.).

Figure 5:10a. Immediate post test of letter name recall.

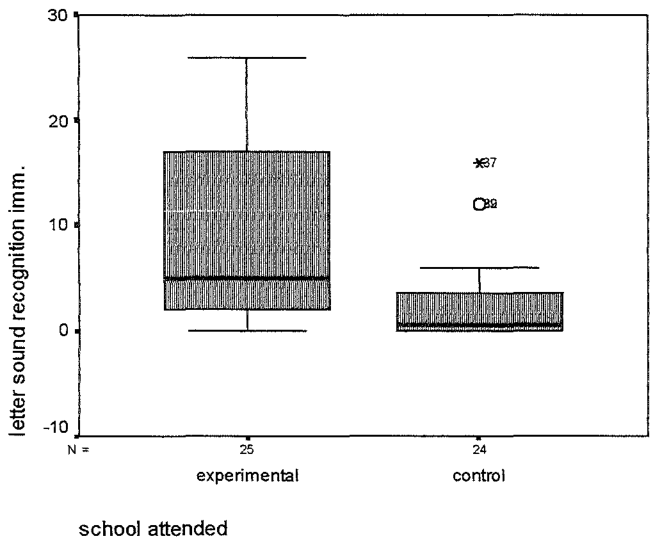


There was, however, a qualitative difference in behaviour between the groups as they carried out the tasks, with the experimental children having a greater familiarity with the letters, often giving the names and sounds as well as other miscellaneous information pertaining to the letters.

Letter sound recognition and recall.

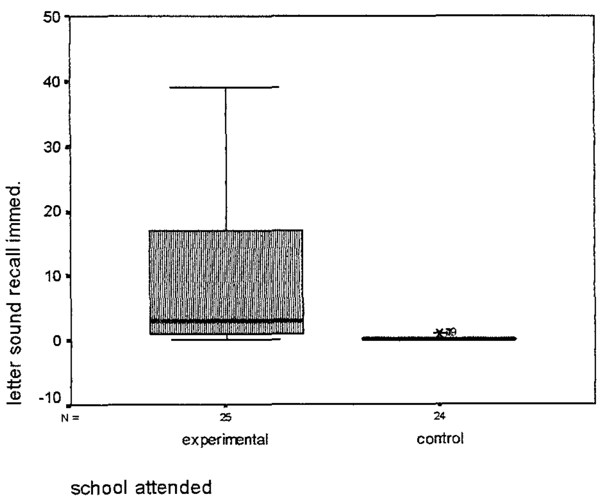
Both measures of letter sound knowledge show significant differences between groups; for letter sound recognition (mean E = 9.24, SD 9.30; mean C = 2.67, SD 4.53; z=-3.265, p>.001) and for letter sound recall (mean E = 10.88, SD 13.52; mean C = 8.33E-02, SD .28; z=-5.279, p>.000). Most of the control children were close to floor on these tasks, but two children scored 12 and one scored 16 for sound recognition (see Figure 5:11).

Figure 5:11. Immediate post test of letter sound recognition.



As the control children pointed to the letters they 'corrected' the sound to the name, seemingly recognising the letters through the similarity of the sounds to the names.

Figure 5:11a. Immediate post test of letter sound recall.



Whereas, the experimental children would point to the letter on the recognition task, repeating the sound and adding other information from the stories. Even the children who had a low score or who scored zero offered many sounds and the stories that went with letters but just got confused between the letter shapes. The boxplot in Figure 5:11a, demonstrates the strong floor effects for the control children on the letter sound recall task, again with just 2 children who could produce one corresponding phoneme in response to a printed grapheme. Here too the experimental children's behaviour was quite different from the control children's, in that they would offer a repertoire of sounds and actions even if they were confused between the letters. Or they would 'know' the sound but not be able to pronounce it (e.g. "That's for the clown that makes the sound with his tongue out" for /th/). In fact, the action was an important feature in remembering the digraphs for the several children who did.

Conclusion.

In conclusion, at the end of the intervention in the experimental school, the experimental group was familiar with most of the phonemes in the English language. Throughout the intervention and the letter knowledge post tests they were all comfortable with making the sounds of isolated phonemes. Qualitatively, the experimental group's behaviour concerning written language was quite different from the control group's. Most of the experimental group demonstrated both an awareness that words can be broken down into sounds and that letter-sounds can be built up into words, even if they were not secure in the specifics. The nursery teacher remarked on the quality of the children's work post intervention, as many children were spontaneously writing their own, quite legible, captions under their drawings sounding out the words as they did so. The control children showed no such awareness of speech sounds or written language but on the other hand they had developed a general confidence in interactions with adults as well as a generally high level of concentration. They had become more compliant and homogeneous as a group than the experimental children, probably due to the calmer, more stable atmosphere in their nursery. The schools were not visited again until towards the end of the summer term when the second complete set of data was collected.

Chapter 6.

End of the Nursery Year.

Apart from the sub-set of post-tests, letter names and sounds, that was administered to both groups immediately following the intervention and reported in the previous chapter, the first complete range of post-tests (PT1) was carried out at the end of the nursery year, with testing beginning in May 1998. The mean age of the children when these measures were taken was 4 years and 2 months. In general all the children had developed as would normally be expected throughout the 8 months of nursery school, but some significant differences were beginning to emerge between the two groups. This chapter will focus on the children's progress and make a detailed analysis of their developing abilities between the baseline measures and PT1.

Control Measures.

The results in Table 6:C below demonstrate that there are still no significant differences between groups on the following control measures: BPVS, Auditory Discrimination and Attention, Word Repetition, Digit Span, Greek Letter Visual-Sequential Memory Test, Letter Name Recognition and Recall, and Mathematics. However, there were significant between group differences on two of the control measures at this point. Firstly, the experimental group showed a significant advantage on the measure of phonological awareness, rhyme detection, and secondly, the control group showed a significant advantage on one of the measures of phonological memory, non-word repetition. As in most cases the distributions violated the rules for parametric tests, unless otherwise stated, the results were analysed using the non-parametric Mann Whitney Test.

Table 6:C. Summary of Post-Test 1 Outcomes. (End of Nursery Year).

Control Measures.

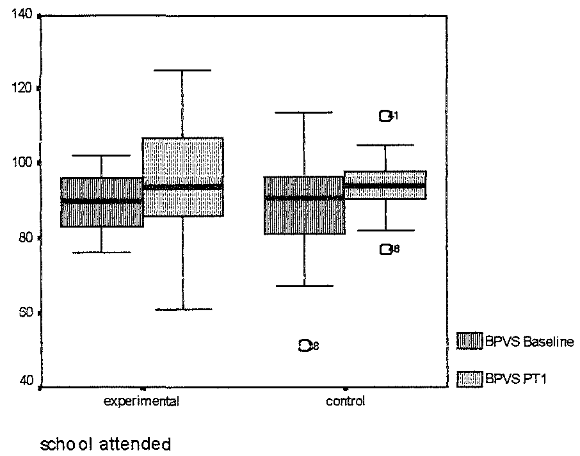
		N 25	N24		
Oral Language		Exp	Control	Stat.	Probability
BPVS Standard Scores.	Mean	95.12	94.17		
	SD	15.06	7.69	z=-.241	ns
Auditory Perception					
Auditory Disc. & Attention	Mean	12.32	15.58		
(Raw error scores) 17 items	SD	7.89	13.48	z=-.280	ns
Phonological Awareness					
Rhyme Detection (10/12)	Freq.	n14 (56%)	n5 (21%)	chi 6.379,df1	p<.012
Change to rhyme awareness	Freq.	n13 (52%)	n4 (17%)	chi 6.747, df1	p<.010
Phonological Memory					
Word Repetition	Mean	14.4	14.75		
Maximum Score 15	SD	1.04	0.61	z=-1.473	ns
Non-Word Repetition	Mean	12.4	13.58		
Maximum Score 15	SD	1.98	1.69	z=-2.302	p<.021
Digit Span	Mean	2.8	2.75		
Maximum Score 7	SD	1	0.9	z=-.128	ns
Visual Memory					
Greek Letter, Visual-Seq.	Mean	2.96	1.79		
Memory Test. Max sc. 12	SD	2.65	1.67	z=-1.488	ns
Alphabet Knowledge					
Letter Name Recognition	Mean	11.88	10.29		
Maximum score 26	SD	9.18	9.37	z=-.781	ns
Letter Name Recall	Mean	8.2	8.42		
Maximum score 26	SD	9.19	8.31	z=-.261	ns
Mathematics					
BAS Number Skills	Mean	11.64	9.42		
Maximum score 36	SD	4.75	4.97	z=-1.706	ns

Oral Language.

BPVS.

It can be seen in Figure 6:12 below that both groups are still matched at Post Test 1 (PT1). The means of both groups have risen equally from baseline to PT1 (E by 5.49 and C by 5.42) but the spread of the PT1 scores for the experimental group has increased since baseline (E baseline SD 7.73 to E at PT1 SD 15.06), whereas the spread of PT1 scores for the control group has decreased (C baseline SD 14.05 to C at PT1 SD 7.69). A Mann Whitney Test reveals no statistically significant differences between the groups (mean E = 95.12, SD 15.06; mean C = 94.17, SD 7.69; z=-.241, ns).

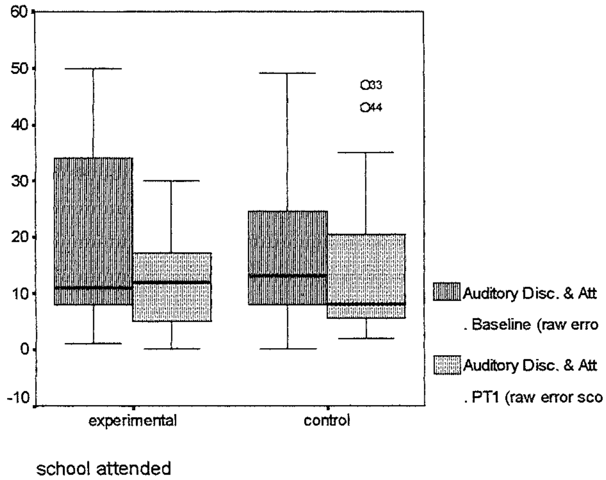
Figure 6:12. Pre and Post Test Measures of Oral Language. BPVS.



However, the experimental group's scores increased significantly from pre to post test (mean E baseline = 89.63, SD 7.73; mean E PT1 = 95.12, SD 15.06; z=-2.357, p<.018), whereas no significant increase was detected in the control group (mean C baseline = 88.75, SD 14.05; mean C PT1 = 94.17, SD 7.69; z=-1.872, ns). Figure 12 shows that the spread of scores in the experimental group contains scores lower at PT1, than at baseline. This was for two reasons, firstly, a Somali girl, who spoke very little English, scored lower at PT1 (61) than at baseline (76), after her score was adjusted for the EAL norm. She was a lively child whose vocabulary was increasing and who had responded well to the intervention. The reduction in her score may have been due either to her slightly erratic behaviour or her initial score may have been achieved by chance. Secondly, the child who refused to take part in the BPVS baseline measures was included at PT1 but attained only a very low score (78). In the control group, the Nigerian boy (EAL) with the very low baseline score (51) had caught up, with a score of 92 by PT1

Auditory Discrimination and Attention.

<u>**Figure 6:13**. Pre & Post Test Measures of Auditory Disc. & Att. : Error Scores.</u>



At pre-test, 4 children in the experimental group and 1 in the control group were too immature to carry out the task but these children were included at PT1. Although the difference in the error scores of auditory discrimination and attention between the groups is not significant (mean E = 12.32, SD 7.89; mean C = 15.58, SD 13.48; z=-.280, ns) there is, however, a significant difference between the experimental group's pre and post-test error scores (mean E baseline errors =18.86, SD 15.94; mean E PT1 errors = 12.32, SD 7.89; z=-2.392, p<.017) but not the control group's (mean C baseline errors = 17.39, SD12.45; mean C PT1 errors = 15.58, SD 13.48; z=-1.362, ns). Having made marginally more errors (ns) at baseline, the significant reduction in errors for the experimental group may simply be due to the fact that the group had more scope for improvement than the control group, while still maintaining the non-significant difference. After a year in nursery the children in both groups had a greater ability to attend to the task. However, the experimental group may have been more tuned in to the phonemes within words which may have made an extra contribution to the reduction of their discrimination errors.

Phonological Awareness.

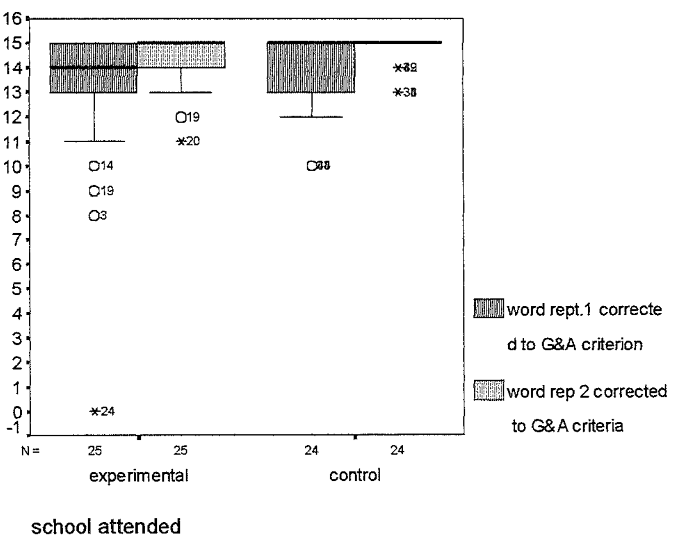
At baseline only one child in each group was able to detect which sets of three words rhymed compared with sets of three words that did not. At PT1 this number rose to 14 children (56%) able to detect rhyme in the experimental group but only 5 children (20.8%) in the control group. The difference between the groups was statistically significant (Pearson's Chi Square Test = 6.578, df1, $p<.010$). Bradley and Bryant (1983) and Maclean, Bryant and Bradley (1987) have suggested that pre-schooler's phonological awareness, found to be strongly related to their eventual success in reading (Bradley & Bryant, 1983; Lundberg, Olofsson, & Wall, 1980) originated from early experiences with nursery rhymes, songs and rhyming games. They claimed that rhyme awareness has a powerful influence on children's success in learning to read. By increasing the amount of experience that 3 year old children have with nursery rhymes, Maclean et al (1987) proposed, there would be a corresponding improvement in their awareness of sounds, and hence a greater success in learning to read. However, the control school in this study specifically focused on rhyming games and nursery rhymes to enhance the children's rhyme awareness in preparation for learning to read but the children's rhyme awareness, as measured by the rhyme detection test, had not significantly improved from baseline to PT1. On the other hand, over half the experimental children were able to demonstrate rhyme awareness at this stage, possibly due their attention being drawn explicitly to the phonemes within words. This casts doubt on the causal role of rhyme awareness in learning to read and suggests that explicit phoneme awareness training can enhance rhyme awareness. It remains to be seen which will have the strongest relationship with reading at PT2, at the end of the Reception Year, rhyme awareness, phoneme identification or alphabet knowledge.

Phonological Memory.

Word Repetition.

Most children in both groups were almost at ceiling, (i.e. 15), for the word repetition at PT1. The statistical analyses showing a non-significant difference between groups must therefore be viewed with caution as ceiling effects restrict the variation in the scores (mean E = 14.40, SD 1.04; mean C = 14.75, SD .61; z=-1.473, ns). Figure 6:14 illustrates that only 4 of the control children failed to reach ceiling at PT1, whereas 8 of the experimental children had scores between 11 and 14. However, as would be expected over a period of 7 months, there was a significant improvement for both groups in word repetition from pre to post-test (mean E baseline = 12.96, SD 3.35; mean E PT1 = 14.40, SD 1.04; z=-2.447, p<.014) and (mean C baseline = 13.88, SD 1.76; mean C PT1 = 14.75, SD .61; z=-2.617, p<.009) as many children were now able to repeat correctly, words that had previously been mispronounced (e.g. brus'/brush, skiral/squirrel, mokerbike/motorbike, or umbella/umbrella etc).

Figure 6:14. Pre & Post Test Measures of Phonological Memory. Word Repetition.



Some children made very large improvements, for example the two children with very low scores in the experimental group at baseline (an English girl at floor who failed to respond to most items and an EAL girl scoring less than half correct (see Fig. 6:14), are both at ceiling at PT1. Instead, 2 other low outliers become evident in the experimental group at PT1. These scores belong to a girl who is English and appears to have very immature and idiosyncratic speech and the third is a Ghanaian boy (EAL) who spoke so quietly it was difficult to record his responses accurately. Gathercole and Adams found that word and non-word repetition scores correlated highly with each other as well as with vocabulary scores (BPVS), articulation rate and to a lesser extent, with digit span. In contrast they found that the digit span measure did not correlate with the BPVS or articulation rate and claimed that this distinctive pattern of association indicated that phonological memory skills could be reliably tested in children of 2 and 3 years of age. They proposed that "there is a common phonological memory factor underpinning the digit span, non-word repetition, and word repetition measures but that the repetition measures have selective links with other cognitive skills". However, this was not the pattern of associations found either at baseline or at PT1 in this study. At baseline non-word and word repetition scores correlated highly with each other ($r=.814$, $p<.000$) and with digit span (non-word $r=.543$, $p<.000$; word $r=.406$, $p<.004$), as Gathercole and Adams found, but only word repetition correlated with the BPVS (word repetition $r=.289$, $P<.047$) and this association was weaker than the link between word repetition and digit span ($r=.406$, $p<.004$). At PT1, however, the pattern has changed. Now, non-word and word repetition still correlate highly with each other ($r=.546$, p,.000) but neither correlates with digit span (non-word $r=.193$, ns; word $r=-.007$, ns) which in turn is now the only measure to correlate with the BPVS ($r=.351$, $p<.013$) the converse of Gathercole and Adams' findings. At baseline the repetition measures did not therefore, have the special relationship with the vocabulary scores that Gathercole and Adams suggested they do. Furthermore, 7 months later at PT1, the repetition measures, while remaining highly associated with each other, are not significantly linked with either digit span (the non-lexical measure of short term memory) or the vocabulary scores on the BPVS. When analysed by syllable length, although there was a significant relationship between the two syllable length of word repetition and BPVS at baseline ($r=.366$, $p<.010$) there was no association at any syllable length at PT1. It must be pointed out, however, that 14 children were unable to pronounce the complex cluster /squ/ at the beginning of *squirrel*. This seems to suggest that the association between 2 syllable words and vocabulary scores is due to children with production problems also having a low score on the BPVS. Although digit span correlated with every syllable length to at least 0.03 level of significance at baseline, this effect also disappeared by PT1. One interpretation of these results would suggest that there are different factors underpinning performance in the word repetition task, digit span and vocabulary as the pattern of results is unstable over time. It is therefore questionable as the reliable test of phonological memory that Gathercole and Adams claim it to be. An alternative explanation might be that in the present study some of the words used by Gathercole and Adams were replaced, and that this may have contributed to the different outcome. However, if results for non-word repetition follow the same pattern, it will cast doubt on this explanation. The subjective scoring system may also be a cause of failure to replicate Gathercole and Adams findings, but the final analyses were based strictly on their criteria and the pattern of results remained unchanged from results obtained without taking accent or systematic substitution of phonemes into account. A full list of baseline and PT1 word repetition errors can be found in Appendix 5a.

Non-word repetition.

It can be clearly seen in Figure 6:14a that at PT1 the children in the control group are clustered around ceiling but the experimental group lag behind by 1 or 2 items and show a longer tail at the lower end. This difference was statistically significant (mean E = 12.40, SD 1.98; mean C = 13.58, SD 1.69; Z=-2.302, p<.021).

Figure 6:14a. Pre & Post Test Measures of Phonological Memory. Non-word repetition.

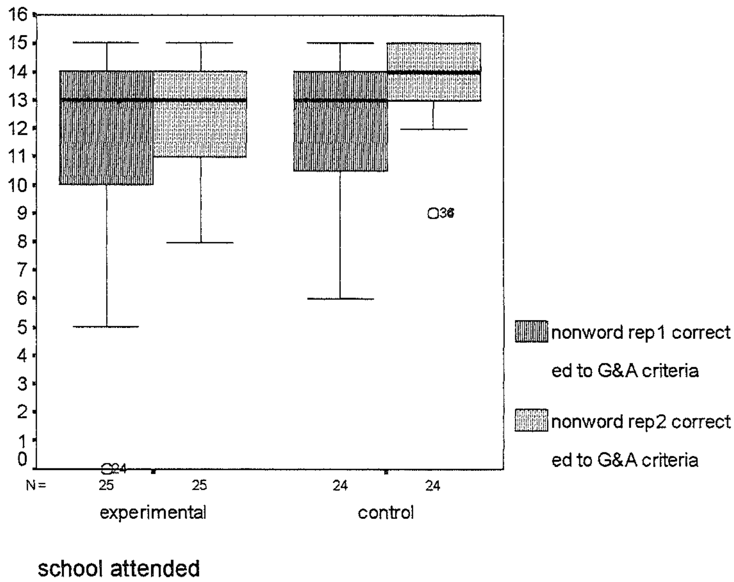


Figure 6:14a, illustrates the improvement between baseline and PT1 for both groups. Unlike the word repetition measure, the non-word repetition improvement for the experimental group from baseline to PT1 was not significant (mean E baseline 11.40, SD 3.65; mean E PT1 = 12.40, SD 1.98; z=-.924, ns) but the improvement in the control scores was (mean C baseline 12.17, SD 2.60,mean C PT1 13.58, SD 1.69; z=-2.421, p<.015). The baseline pattern of associations between non-word syllable length, BPVS and digit span were similar to the word repetition measures in that every syllable length correlated with the digit span measure to at least the 0.03 level of significance but there were no associations at all between syllable length and vocabulary scores. At PT1 the correlation with digit span disappeared, as it had with the word repetition measure. However, a significant correlation was found between 3 syllable non-words and BPVS

(r=.289, p<,044), which Gathercole and Adams proposed to be the strongest measure in support of non-word repetition as a phonological memory task. In this study though, the association between BPVS and digit span at PT1 is even stronger (r=.351, p<.013) than that between 3 syllable non-words and BPVS (r=.289,p<.044).

Closer inspection of the data reveals that at baseline and PT1 there were 72 lexicalisations, where a real word is substituted for all or part of a non-word, and 75% of these were at the length of 1 syllable (54 @ 1 syllable, 6 @ 2 syllables, and 12 @ 3 syllables). Thus 68.4% of all the errors at syllable length 1 were lexicalisations and the substitution of *'towel'* for *'tull'* accounted for nearly half of these, 48.2% with some children adding "what, like *bath/soap*?" For others this may have been a distorted 'London' vowel sound; /ow/ for /u/.

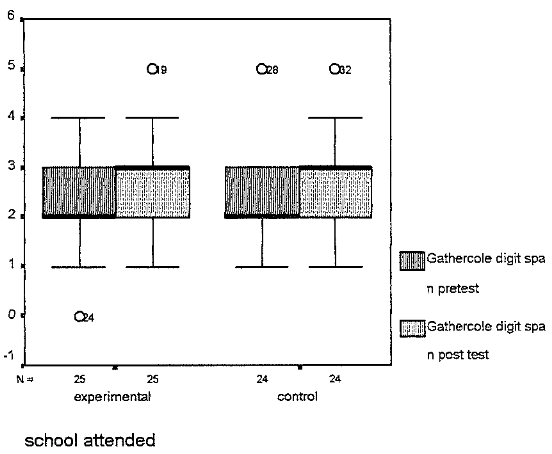
The remaining errors again, as for word repetition, reflected children's immature speech. Some for example, were caused by perseveration, which is a tendency for the impression of a word to dissipate slowly and then recur subsequently; *pararon for parazon,* reversals such as *kiffiner for kannifer* as well as cluster reductions, *purd for plurd* or *bastering for brastering*. There were also examples of the simplification process known as 'fronting' which occurs when a stop consonant is pronounced at the front of the mouth in substitution for consonant pronounced at the back of the mouth; for example, 7 children at PT1 pronounced *bannock* as *bannot.*

Although Gathercole and Adams claim that non-word repetition is a reliable measure of phonological memory, it must be pointed out that they were only able to analyse the data from less than half their original sample. The participants that were included were drawn from a well educated, high socio-economic population. This study attempted to investigate the association between word and non-word repetition and the selective links with vocabulary and digit span, but was unable to replicate Gathercole and Adams' findings with a group of less well advantaged children with below average vocabulary skills. The results of these word and non-word repetition measures will be discussed further in relation to previous findings at the end of the control measures section. A full list of baseline and PT1 non-word repetition errors can be found in Appendix 5b.

Digit Span.

The final test of phonological memory is the digit span test, Figure 6:14b below illustrates how well matched the groups are at both baseline and PT1. The median score in both groups improves from 2 to 3 (mean E = 2.80, SD 1.00; mean C = 2.75, SD .9; z=-.138, ns). The high outlier in the experimental group, scoring 5 at PT1 after previously only scoring 1 at baseline, was the same Ghanian (EAL) boy who had an extreme low score for word repetition. The control EAL girl with the outlying high score at baseline still had a high score at PT1, recalling two sets of 4 digits. The outlier at PT1 belongs to a boy who also scored at ceiling on both repetition tests and was among the 5 'rhyme aware' control children.

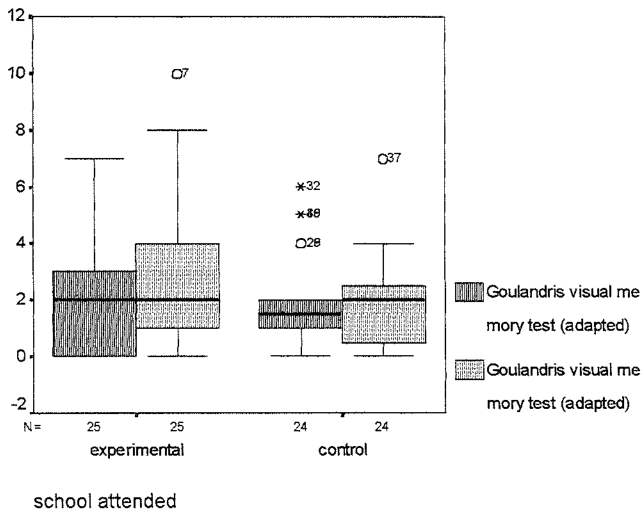
Figure 6:14b. Pre & Post Measures of Phonological Memory. Digit Span.



As discussed above Gathercole & Adams found that digit span correlated weakly with word and non-word repetition but not at all with BPVS. In this study, at baseline, digit span correlated highly with word and non-word repetition at every syllable length (1 syllable r = .416, p<.003; 2 syllables r = .491, p<.000; 3 syllables r = .460, p<.001) and as Gathercole & Adams found, did not correlate at all with the BPVS (r = .040, ns). However, by PT1, 7 months later, digit span had no significant links with the repetition tasks but was quite strongly associated with the BPVS (r=.351, p<.013). The reason for this can be found in the relative improvements of each task from baseline to PT1. Digit span and BPVS showed the greatest improvement (Digit Span z =-3.198, p<.001 ;BPVS z =-2.982, p<.003) with non-word repetition showing the least improvement (z = -2.290, p<.022).This seems to suggest that at this stage in the development of children with poor articulation, a digit span test offers a purer measure of phonological memory as the confounding variable of speech production difficulty does not contaminate the data. Children who have sufficient STM capacity for phonological information that enables them to recall and repeat the greatest number of digits, also have sufficient short and long term memory capacity for phonological information that enables them to store and recognise the greatest number of words.

Visual Memory.

Figure 6:15. Pre & Post Test Measures of Visual Memory.



There were no significant differences between the groups on visual memory at PT1 (mean E = 2.96, SD 2.65; mean C = 1.79, SD 1.67; z=-1.488, ns). The outlying score in the experimental group belonged to a boy who did very well and was very enthusiastic about the intervention programme. He compared and contrasted the Greek letters with English letters throughout the test. Figure 6:15 shows that the median score for both groups is 2 and although the improvement from pre to post test is not statistically significant for either group (mean E baseline = 2.08, SD 1.91, mean E PT1 = 2.96, SD 2.65, z=-1.893, p<.058 jns; and mean C baseline = 1.88, SD 1.73, mean C PT1 = 1.79, SD 1.67, z=-.048, ns), the experimental group has risen up from floor at PT1 and their improvement just misses significance. Like the non-words that were contaminated by lexical representations the Greek letter test may also be contaminated by letter knowledge, as most of the children that were able to carry out this task appeared to use their alphabetic letter knowledge as a mnemonic. This anecdotal evidence seems to be supported by the data as alphabet knowledge and visual memory were highly correlated with each other at PT1 (name recognition (r= .442, p<.001 and recall r= 458, p<.001; sound recognition r=.553, p<.000 and recall r= .596, p<.000) and it can be seen that the correlations were even higher for letter sound knowledge than letter name knowledge. One interpretation could be that the more information that the children had about alphabetic letters, the more they were able to use their knowledge as a mnemonic for the visual memory task. A second interpretation could be that the children who had more experience of focusing on printed letters were more able to remember the Greek symbols. This second interpretation could be supported by the 'just not significant' improvement of the children in the experimental group who were encouraged to trace letter shapes in the air and on paper. Or thirdly, there may an underlying cognitive skill that supports both letter learning and any other visual memory task. In common with the non-word repetition task where children tried to make sense of nonsense words, there seems to be drive in the visual memory task to make sense of novel shapes. It remains to be seen how the visual memory task in this study correlates with the final reading measures one year on to examine its possible effectiveness at identifying children with specific visual memory difficulties that could lead to reading failure. Lack of correlations between visual memory and reading measures would support Vellutino's (1979) position that reading difficulties are more to do with the verbal component of written language than with visual deficits. On the other hand if correlations are found between reading measures and visual memory it could indicate that visual memory has an influential role in literacy and a poor visual memory might be an indication of specific visual difficulties leading to reading failure. There were too few children who could read at PT1 to carry out any comprehensive analysis at this stage. There were only three children who were unable to read or write any words at baseline but who scored on all the reading and writing tests at PT1, i.e. BAS reading, reading words, reading non-words and writing words. These children were all in the experimental group and they all had the highest visual memory scores at PT1, between 8 and 10. The single next highest score of 7 belonged to a control child who, interestingly, had the outlying high score on the visual puzzle solving test (McCarthy's test of non-verbal IQ). At baseline the 3 experimental children with reading/writing scores, were in the upper half of the distribution but only with scores equal to 4 of the control children. So there is the possibility that at this stage the visual memory test does identify children whose visual memory ability enables them to take advantage of literacy training which in turn improves their visual memory ability. A debate in the literature regarding the role of visual memory will be discussed at the end of the control measures section.

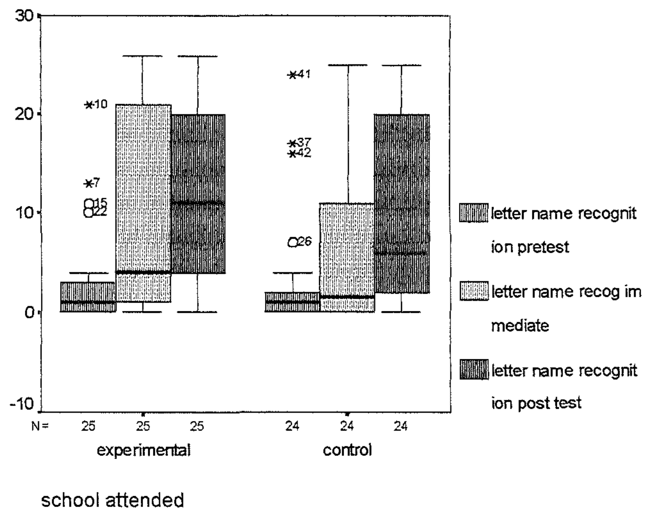
Alphabet Knowledge.

Immediately following the intervention, measures of letter name recognition and recall were taken, with no significant differences between groups on either measure. The results of these immediate post-tests will be included in the following graphic displays of the letter name recognition and recall data.

Letter Name Recognition.

Although there were still no significant differences in letter name recognition between the groups at PT1 (mean E = 11.88, SD 9.18; mean C = 10.29, SD 9.37; z=-781, ns) it can seen in Figure 6:16 that the experimental group's progress was accelerated at the immediate post-test stage.

Figure 6:16. Pre, Imm. and Post Test Measures of Letter Name Recognition.



By the end of the nursery year, half the experimental group could recognise more than 10 letter names. The control group had made steady progress from baseline and half the group could recognise more than 5 letter names at PT1.

A series of chi square tests revealed that there were no statistically significant differences between the groups on the number of times each individual letter of the alphabet was recognised either at baseline or at PT1. However, the frequencies for most of the letters were (non-significantly) greater for the experimental children than the control children with the exception of the letters 'c', and 'q' 'i', 'l', as can be seen in Table 6:4

Table 6:4. Letter Name Recognition Frequencies; n/s Group Differences

(Differences in brackets show advantage for control group).

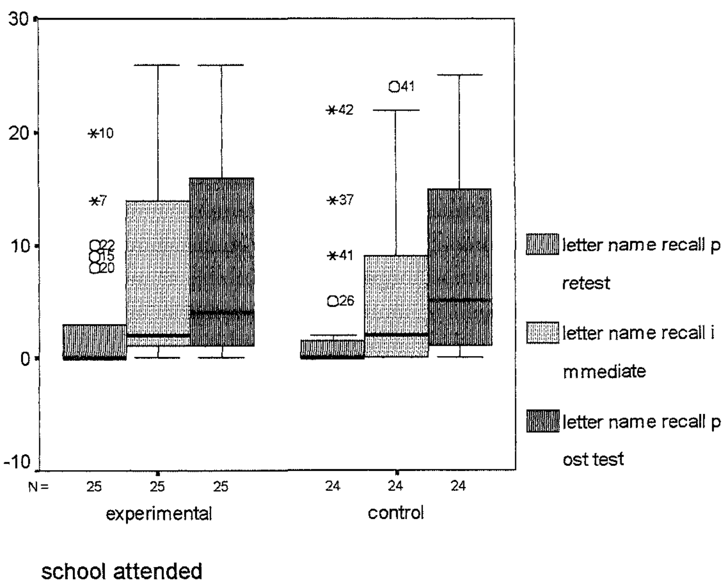
Letter	Exp.	Cont.	Diff's.		Letter	Exp.	Cont.	Diff's.
a	12	9	3		n	9	6	3
b	11	6	5		o	21	19	2
c	10	12	[2]		p	14	10	4
d	11	6	5		q	8	10	[2]
e	12	10	2		r	13	12	1
f	10	7	3		s	17	15	2
g	9	8	1		t	9	7	2
h	13	7	6		u	7	5	2
i	10	11	[1]		v	10	6	4
j	11	11	0		w	12	9	3
k	13	12	1		x	16	14	2
L	7	8	[1]		y	9	6	3
m	12	11	1		z	12	11	1

A table showing the order in which the combined groups learned to recognise the letter names can be found in the discussion at the end of the control measures section.

Letter Name Recall.

Groups were well matched on letter name recall from the beginning to the end of the nursery year as can be seen in Figure 16b (PT1 mean E = 8.2, SD 9.19; PT1 mean C = 8.42, SD 8.31; z=-.261, ns).

Figure 6:16a Pre, Imm. & Post Test Measures of Letter Name Recall.

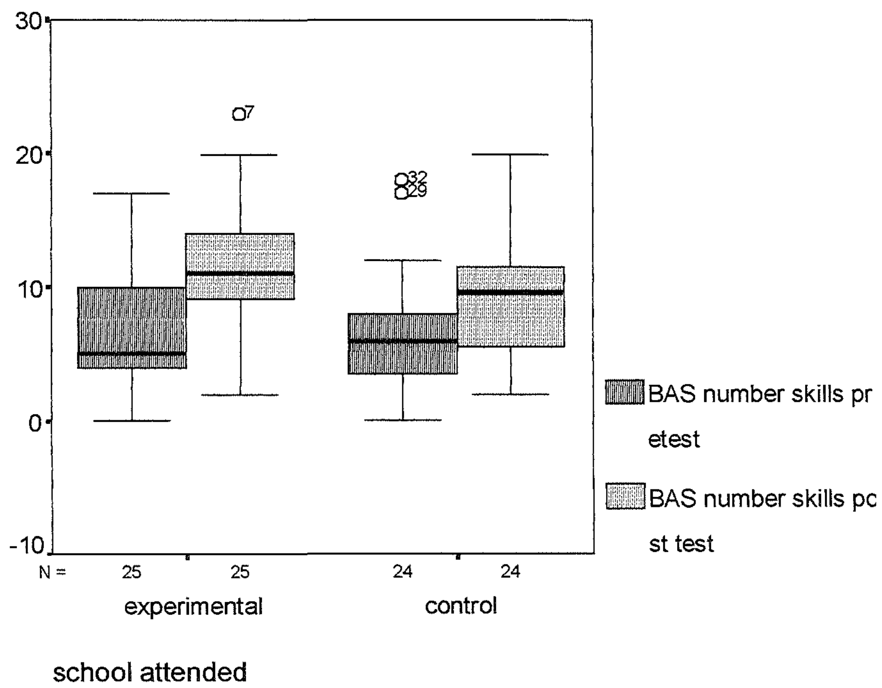


By the end of the nursery year there were still children in both groups unable to recall any letters, as well as children who could recall them all. However, there was a qualitative difference between the groups with respect to their incorrect responses. Many of the experimental children offered a range of sounds or words, sometimes correct for the target letter, but could not access the letter name, whereas the control children either answered with same set of letter names for every letter or they were unable to respond at all.

BAS Number Skills.

The final control measure, number skills, was also still well matched at PT1 (mean E = 11.64, SD 4.75; mean C = 9.42, SD 4.97; z=-1.704, ns) as shown in Figure 6:17.

Figure 6:17. Pre & Post Measures of Number Skills.



Discussion of the Cognitive Abilities of Less Advantaged Children as Revealed by these Control Data.

Although the control data were collected simply to demonstrate that the groups were well matched on factors thought unrelated to literacy development, the data proved interesting in their own right. Of particular interest were measures of phonological and visual memory and to a lesser degree the data collected from the letter-naming task. It is therefore worth relating these data to previous findings before moving on to the analysis of the experimental measures.

Phonological Memory and its measurement and relation to vocabulary development.

Word Repetition.

Gathercole and Adams (1993) proposed that word repetition was a sensitive measure of phonological memory in pre-school children. The 54 participants in their study with ages ranging between 2 years 10 months and 3 years 1 month (mean 3 years) were much younger than the children in the present study. Although Gathercole & Adams made a positive effort to include children from a wide range of socioeconomic backgrounds, they had to exclude over half their initial sample due to incomplete sets of data. As the demographic characteristics of the participating families include 90.8% of mothers and 86.9% of fathers with qualifications above 0-level and as there are no parents from the two lowest SES occupational categories, it may be the case that the participants excluded from the study belonged to a less advantaged socio-economic category. The mean standard score on the BPVS in Gathercole and Adams' study was average 102, corresponding to a vocabulary age of 3 years and 2 months (1 month older than their oldest participant). In comparison the children in the present study had below average scores on the BPVS (mean E = 89.63, SD 7.73; mean C = 88.75, SD 14.05). The highest rates of incomplete data from the children who were excluded from Gathercole and

Adams' study were found for the tests in which an accurate spoken response was required from the child, e.g. word repetition (31 children), non-word repetition, (17 children), and digit span (19 children). This reflects the difficulty of eliciting a verbal response from very young children as well as the difficulty of recording the responses accurately. Gathercole and Adams counted the responses incorrect if the experimenter judged that the child produced a sound that differed phonemically from the target word (or non-word). However, they point out that, if it was perceived that the child systematically mis-articulated a particular phoneme in their normal speech, credit was given for the substituted phoneme. Although they claimed that this happened relatively infrequently in their well-educated sample, phoneme substitution was a common cause of error in the less advantaged sample in this study. There were several children with highly idiosyncratic speech and the majority of the participants in this study spoke with a London accent which systematically drops the initial aspirates (e.g. 'at for hat) and final stops (e.g. ca' for cat). In addition to the problem of accurately categorising words spoken in the London accent there was a further problem in adhering to Gathercole and Adams' criteria. As the vast majority of the children had very poor articulation and vocabulary skills it was difficult to assess whether they 'systematically' mispronounced specific phonemes. Many of the word repetition errors reflected immature speech processes. For example, cluster reduction, which involves the omission of a 'glide' (/r/, /l/, /w/), was apparent in both words and non-words; for words, bush for brush, skirrel for squirrel, and umbella for umbrella were quite common and for non words, gindle for grindle, purd for plurd, gall for grall, basting for brastering, tumperine for trumperine occurred frequently. At baseline cluster reduction accounted for 6.8% of errors for words and 5.3% of errors for non-words, falling to 1.3% for words at PT1 and 0.82% for non-words. This rate of fall over the first months in nursery suggests a production problem for these errors at baseline rather than a phonological memory deficit. Similarly, other features of immature speech are evident in many of the word errors, such as assimilation, where a consonant changes under the influence of another dominant consonant in the word; mokerbike for moterbike, umblella for umbrella, eleplant for elephant etc.. There were also examples of consonant reversals and substitutions; mokerbite for motorbike, ungrella for umbrella, kirsel for squirrel etc. Therefore, the scoring system may seem rather subjective with words like *samwich/sandwich* accepted as a normal lexical representation for these children, in spite of the medial consonant /d/ being pronounced clearly by the experimenter, while *buttin/ button* was not accepted even though London vowel sounds are commonly distorted. A comprehensive list of the errors included and excluded at baseline (T1) and at PT1 (T2) can be found in Appendix 4. It is questionable, therefore whether a pattern of results similar to Gathercole and Adams will emerge from this data drawn from a less advantaged socio-economic group, with production problems that may obscure any effects of phonological memory differences.

Non-Word Repetition.

There is currently a debate in the literature regarding the role of non-word repetition as a measure of phonological memory. Dollaghan, Biber, and Campbell (1995) observed that the majority of errors in non-word repetition were due to substituting a word in place of a non-lexical syllable and concluded that lexical knowledge intrudes on performance in non-word repetition. These observations resonate with the current study where most of the 1 syllable non-word errors were substitutions, as noted above, the most common being, *towel* or *tell* for *tull,* but also *mate for nate, nut for mot, crawl* or *growl for grawl.* Four of the substitutions at syllable length 2 were *dinner for diller,.* The complete substitution at syllable length 3 was *trampoline for trumperine,* but there were a number of syllable substitutions within words, like *trunk for trump, breast for brast*, and several tended to distort *dopelate* into a version of *chocolate.* The need for children of this age to make sense of the words was evident when one child, on hearing the non-word *brastering*, said "My mum does that". When asked how, she replied "When she feeds the baby" (breastfeeding).

Gathercole (1995) tested whether the contribution of lexical knowledge would be less for non-words rated low in word-likeness than for non-words rated high in word-likeness. Her logic was that non-words rated low in word-likeness would not closely resemble any known word pattern and thus would not be supported in STM by any one specific item in the mental lexicon. She concluded that the significant correlation that she found between the correct repetition of non-word-like pseudo words and vocabulary size was evidence that increased STM capacity leads to better non-word repetition and hence to better vocabulary learning. Recently, a different interpretation of the association between non-word-like pseudo words and vocabulary growth was proposed by Metsala (1999) who suggested that the ability to repeat non-words accurately develops *out of* vocabulary growth because of the resulting pressure to discriminate between an increasing number of similar sounding lexical entries. Metsala therefore suggests that the relationship between vocabulary size and non-word repetition results from the mediating influence of phonemic representations rather than from phonological memory. It is argued that vocabulary growth leads to more segmentalized representations, which in turn leads to better performance on non-word repetition tasks.

The present results suggest that the children found many of the non-words to be word-like and therefore according to Dollaghan et al (1995) as a measure of phonological memory it is contaminated by lexical knowledge. Alternatively, according to Metsala (1999) the measure has little to do with phonological memory at all but instead emerges out of vocabulary growth and the restructuring of the mental representations of words. In this study no significant correlations have been found between vocabulary scores and the scores on the non-word repetition task, at either baseline or PT1, whereas, at both baseline and PT1 digit span has consistently correlated with vocabulary scores.

Visual Memory and its Role in Reading Development.

As Greek symbols were the basis from which Roman letters were derived, the children in the present study were intuitively correct to use the alphabet as a mnemonic for the novel symbols. But even when tasks are less letter like, there still seems to be the same drive to impose known characteristics on unknown figures, transforming the visual image into a verbal code. Goulandris and Snowling (1991) found their adult dyslexic subject JAS used a similar verbal coding strategy to the children in the present study, even when trying to remember geometric shapes that had been specifically designed to be difficult to code verbally (Hulme 1981). For example, she claimed that one figure resembled a traffic sign and another, "a squiggly 'd' with no back". It may be that the verbal strategy JAS was using was an immature strategy, as when she attempted a more visual mental tracing strategy her performance improved. Or it may be, as Vellutino (1979) suggests, that it is at the interface of visual and verbal coding that a problem arises for developmental dyslexics. In a series of experiments he found no evidence of visual memory deficits in poor readers. One study comparing poor and normal readers age 7 and 11 years (Vellutino, Smith, Steger, and Kamman (1975), found no difference between the poor and normal readers ability to copy geometric designs and 3,4,and 5 items of scrambled letters and numbers but the poor readers diverged from the normal readers on the pronunciation of the word, letter and number stimuli. Vellutino (1979) suggests that this evidence supports his thesis that poor readers have selective difficulties in apprehending the verbal aspects of written words. In a further study he demonstrated that poor readers, as a group, do not sustain a basic deficiency in either short or long-term memory. He designed a study using orthography unfamiliar to both the poor and the normal readers and compared them with a third group familiar with the orthography and consequently its phonology. He found that the poor readers copied 3,4 and 5 letter words in Hebrew, as well as the normal readers. But, except for 3 letter items on which all groups were equivalent, the performance of both groups was below that of the children learning to speak, read and write in Hebrew. However, there were two incidental findings that demonstrate the specific visual encoding behaviours of each group. Firstly, both poor and normal readers unfamiliar with Hebrew scanned from left to right and therefore made more omission errors at the right terminal positions of the Hebrew words, whereas the children learning Hebrew, and scanning from right to left, made more omission errors at the left terminal positions. There were no significant differences between the poor and normal readers in number of orientation, sequencing, omission, and substitution errors made, indicating that the poor readers scanned and recalled the letter strings as efficiently as the normal readers. However, where letters were judged to be 'disoriented facsimiles of Roman letters' the normal readers made more orienting errors than poor readers, suggesting that the normal reader's more stable experience with Roman letters influenced their performance. Vellutino proposes that as poor readers are equal to normal readers in reproducing visual stimuli in an unknown orthography, their difficulty only arises in translating visual information into verbal code, "the perceiver simply can not retrieve the phonologic counterparts of the visual features of the accurately perceived stimuli" (Vellutino, 1979). If the results of the present study find a strong correlation between visual memory and reading ability it may demonstrate that visual memory underpins literacy skill and a lack of visual memory therefore could cause reading failure. If, however, visual memory is not associated with reading ability it may support Vellutino's position, that skilled readers translate visual information into a verbal code and perform operations on that code in phonological memory.

Letter Name Recognition Frequencies.

The letters O, X, and S were the letters recognised by more children at baseline in both groups (**'O'** - E=48%, C=38%; **X** - E=32%, C=29%; **S** - E=24%, C=25%) and remained the most well known letters recognised by more than half the children at PT1, (**'O'** - E=84%, C=80%; **'S'** -E=68%, C=63% and **'X'** - E=64%, C=59%) in spite of the different teaching methods. This finding is consistent with other research (Huxford, Terrell and Bradley, 1992; Stuart, 1986). The frequencies in letter recognition have been combined across groups in Table 6:5.

Table 6:5 Letter Name Recognition Frequencies at Baseline and PT1 for combined groups.

Baseline

Letter	Freq.	Percent.
O	21	42.90%
X	15	30.60%
K	13	26.50%
S	12	24.50%
C,M,R,W	7	14.30%
A,E,Z	6	12.20%
N,P,T	5	10.20%
B,F,I,U,V	4	8.20%
D,H,Q,Y	3	6.10%
J,L	2	4.10%
G	1	2%

End of Nursery

Letter	Freq.	Percent.
O	40	81.60%
S	32	65.30%
X	30	61.20%
K,R	25	51%
P	24	49%
M,Z	23	46.90%
C,E,J,	22	44.90%
A,I,W	21	42.90%
H	20	40.80%
Q	18	36.70%
B,D,F,G	17	34.70%
T,V	16	32.70%
L,N,Y	15	30.60%
U	12	24.50%

Experimental Measures.

Table 6:D shows that the experimental group are beginning to demonstrate some modest, but significant differences on a number of the experimental measures, namely; phoneme segmentation, letter sound recall, writing sounds, concepts about print and writing words. In all the experimental tasks the experimental group's responses were qualitatively different from the controls. Incorrect responses were very often reasonable attempts that just missed whereas the control group's incorrect responses were most often no response or a response that was completely off the target. Thus, this stage may be seen as an intermediate point in development in which differences may emerge later in significant results.

Table 6:D. Summary of Post Test 1.

Experimental Measures.

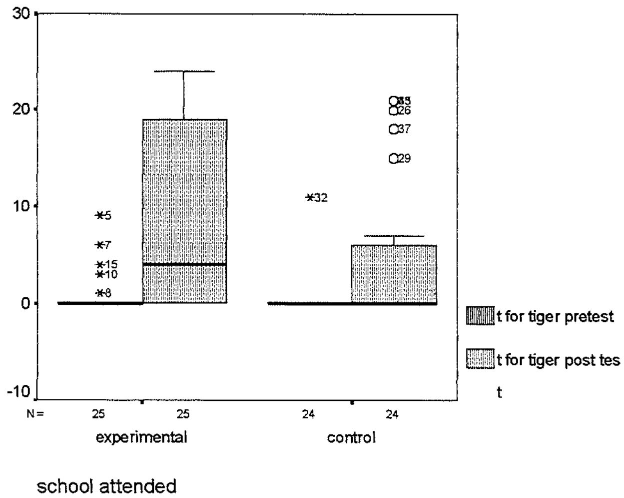
Phoneme Awareness		**Exp.**	**Control**	**Stat.**	**Prob.**
Initial Phoneme Identification	Mean	9.32	4.75		
(t for tiger) Maximum score 24	SD	10.26	7.74	z=-1.363	ns
Phoneme Segmentation	Mean	0.96	0		
Maximum score 12	SD	2.07	0	z=-2.529	p<.011
Phonic Knowledge					
Letter Sound Recognition	Mean	9.56	5.29		
Maximum score 26	SD	9.68	6.23	z=-1.782	ns
Letter Sound Recall	Mean	10.52	1.96		
Maximum score 44	SD	10.7	3.1	z=-4.175	p<.000
Write Sounds	Mean	2.48	0.5		
Maximum score 10	SD	2.86	0.98	z=-2.698	p<.007
Reading					
Print Concepts	Mean	8.16	3.88		
Maximum score 24	SD	4.29	2.27	z=-3.703	p<.000
BAS Single Word Reading	Mean	0.56	0.21		
Maximum score 20	SD	1.58	1.02	z=-.969	ns
Young Reading Test	Freq.	n9 (36%)	n4 (17%)	chi 2.300	ns
Achieved a reading age = 5/15					
Read Regular & Irreg. Words	Mean	0.68	0.21		
(non-standard) Maximum score 12	SD	1.89	0.83	z=-.533	ns
Read Non-Words	Mean	0.64	0		
(non-standard) Maximum score 10	SD	1.82	0	z=-1.733	ns
Writing					
Write Regular & Irreg. Words	Mean	0.52	0		
Maximum score 10	SD	1.42	0	z=-2.022	p<.043

Phoneme Awareness.

Initial Phoneme Identification.

There is no significant difference between the groups for initial phoneme awareness at the end of the nursery year (mean E = 9.32, SD 10.26; mean C = 4.75, SD 7.74; z=-1.363, ns), possibly due to such a wide variation in the scores

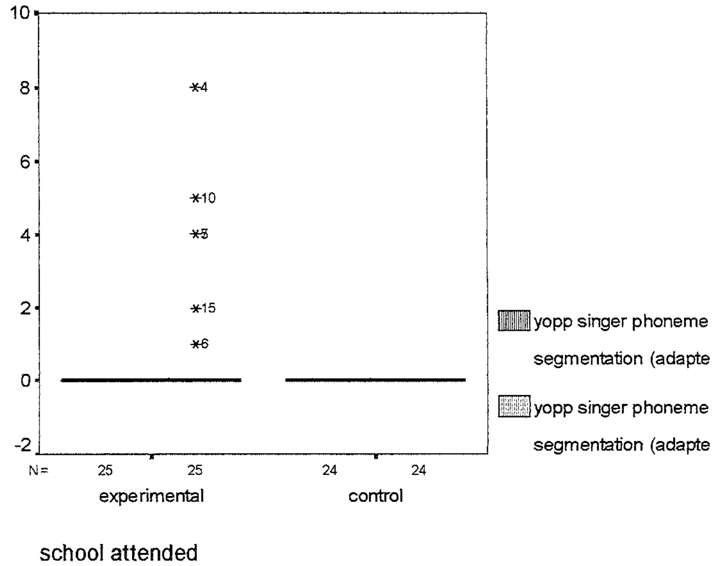
Figure 6:18. Pre & Post Measures of Initial Phoneme Identification.



It can be seen in Figure 6:18, however, that more of the experimental children have been able to isolate and pronounce the first phoneme in a word and 5 of these children achieved the maximum score of 24. Four of the children in the experimental group that achieved the maximum score (at the top of the PT1 whisker in Fig 18), had some initial phoneme awareness at baseline (see individual outlying scores at experimental baseline) and the fifth had scored 0 at baseline. Conversely, the child with the outlying baseline score of 11 in the control group had a reduced score at PT1, with a score of only 5. This seems to demonstrate that the training enhanced the experimental children's existing phoneme awareness.

Phoneme Segmentation.

Figure 6:19. Pre & Post Test Measures of Phoneme Segmentation.



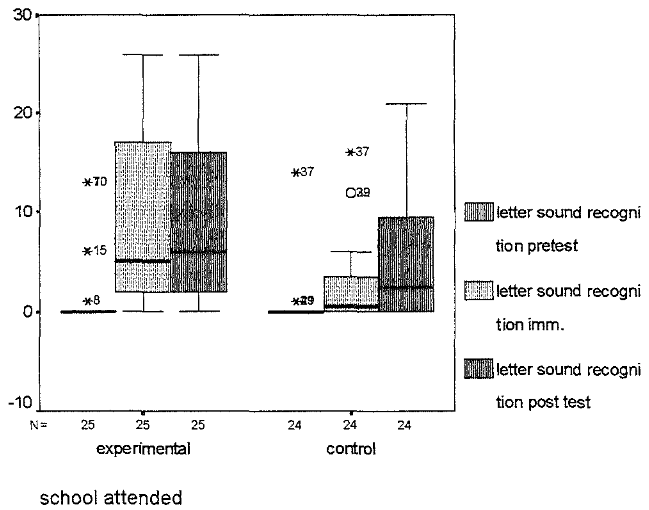
All 5 children who achieved the maximum score on initial phoneme awareness at PT1 plus 1 other who scored 19, had also developed a grasp of phoneme segmentation. These 6 children accounted for the significant difference between the experimental group and the control group, as no child in the control group was able to do the task (mean E = 0.96, SD 2.07; mean C = 0; z=-2.529, p<.011). This statistical analysis, however, must be regarded with caution as floor effects restrict the variation in the scores. Nonetheless, the children with enhanced phoneme awareness skills at PT1 seemed to be able to take advantage of the intervention training and segment words into their component phonemes which, together with blending phonemes into words, is a skill essential to literacy.

Phonic Knowledge.

Letter Sound Recognition.

The significant difference in letter sound recognition at immediate post-test had disappeared by PT1 (mean E = 9.56, SD 9.68; mean C = 5.29, SD 6.23; z=-1.782, ns). The experimental children's median score had risen slightly but some of the children's gains at immediate post-test had dropped by 1 or 2 at PT1. The control children who were more familiar with letter names used this information to identify the letters by their sounds e.g. Q "Can you show me the letter that says /b/?" A "/b/, do you mean 'B'? Pointing to /b/.

Figure 6:20. Pre, Immediate and PT1 Scores of Letter Sound Recognition.



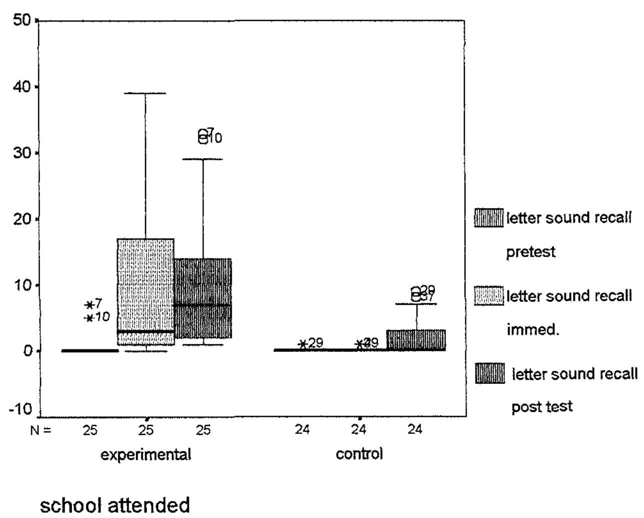
The same 5 experimental children with the maximum scores on initial phoneme identification at PT1 also achieved maximum scores on letter sound recognition at immediate post test and PT1. Three of these children had some knowledge of letter sounds at baseline as can be seen in Figure 6:20. It appears that their early letter sound knowledge might have enabled these children to take maximum advantage of the letter sound training. Conversely, the 3 children in the control group who had some letter sound knowledge at baseline did not feature in the top scores at PT1. They made reasonable improvement from baseline to immediate post-test but made no further improvement by PT1. The child that achieved the top score of 21 in the control group had shown no previous letter sound knowledge at baseline. It cannot therefore be assumed that the children who arrive in nursery with letter sound knowledge will be able to capitalise on that knowledge without adequate instruction.

Again this seems to demonstrate that the intervention training gave maximum advantage to the children who were better at the start as well as enhancing the children's ability at the lower end. As with some of the control measures of alphabet knowledge, the statistics mask the qualitative difference between the experimental and control group's behaviour. The experimental group was much more aware of the difference between letter names and letter sounds. Whereas the children who scored in the control group inferred the sound from the letter name, the children in the experimental group who scored knew the sound for its own value. There was a general atmosphere of knowledge about letters, sounds, and written words that is not evident in the data at this stage.

Letter Sound Recall.

The difference between E and C on letter sound recall at immediate post-test, is still significant at PT1 (mean E = 10.52, SD 10.7; mean C = 1.96, SD 3.1; z=-4.175, p<.000) although the control group has made a significant improvement from immediate post-test to PT1.(mean C imm. = 8.33E-02, SD .28; mean C PT1 1.96; SD 3.1; z=-2.820, p<.005).

Figure 6:21 Pre, Immediate and PT1 Scores of Letter Sound Recall.



Although the difference between the experimental group's immediate and PT1 scores is not significant (mean E = 10.88, SD 13.52; PT1 mean E = 10.52, SD 10.7; z=-.297, ns) there are some interesting and statistically significant differences hidden within the overall scores.

As can be seen in Table 6:6, there was a non-significant increase in the number of single letter-sounds recalled by the experimental group, from a total of 202 at immediate post-test to a total of 230 PT1 (mean immediate = 7.8, SD 3.4; mean PT1 =8.9, SD 4.2; z= -.967, ns). On the other hand, Table 6:6a shows there was a significant decrease in recall of the number of phonemes represented by digraphs from 65 at immediate post-test to 33 at PT1 (z= -2.179, p>.031).

Table 6:6. Analysis of Recalled Single Letter Phonemes by Experimental Group.

	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w	x	y	z
Imm	4	10	5	6	9	8	4	8	6	6	11	4	11	6	9	11	6	10	20	5	6	8	8	10	4	7
PT1	12	8	8	6	9	12	7	10	7	7	12	4	7	6	15	15	5	9	23	9	5	8	5	8	4	9
Diff's	**8**	**-2**	**3**	**0**	**0**	**4**	**3**	**2**	**1**	**1**	**1**	**0**	**-4**	**0**	**6**	**4**	**-1**	**-1**	**3**	**4**	**-1**	**0**	**-3**	**-2**	**0**	**2**

Table 6:6a. Analysis of Recalled Digraph Phonemes by Experimental Group.

	ai	ar	ch	ee	er	ie	ng	oa	oi	oo	oo	ou	or	qu	sh	th	th	ue
Imm	9	0	5	4	0	3	2	4	2	7	7	0	5	4	6	2	3	2
PT1	2	0	2	3	0	0	1	1	3	4	4	0	2	3	6	1	1	0
Diff's	-7	0	-3	-1	0	-3	-1	-3	+1	-3	-3	0	-3	-1	0	-1	-2	-2

As the overall mean score remains the same from immediate to PT1, with a smaller SD and a higher median score, it seems to indicate that more children are firming up on the recall of single letter sounds but, in the absence of any reinforcement, the digraph phoneme correspondences are fading from memory. This is not really surprising, as most of the digraphs were taught towards the end of the intervention period and therefore had fewer opportunities for revision during the intervention than the single letters and would not have been referred to since. However, when failing to produce the correct answer to the question "Can you tell me the sound this letter makes? What does this letter say?" the children would offer a variety of appropriate responses. For example, for the phoneme /e/ some children offered 'egg' and made the appropriate action of breaking an egg from the intervention story. Others would act out pressing a switch and saying on - off for the phoneme /o/. For the digraphs it was much the same; for example, in response to /th/ and /**th**/, some children would stick out their tongues and recall the clowns in the story or for the phonemes /oo/and /**oo**/ they would mention the cuckoo clock and say coo -**coo**, failing to drop the initial /c/.

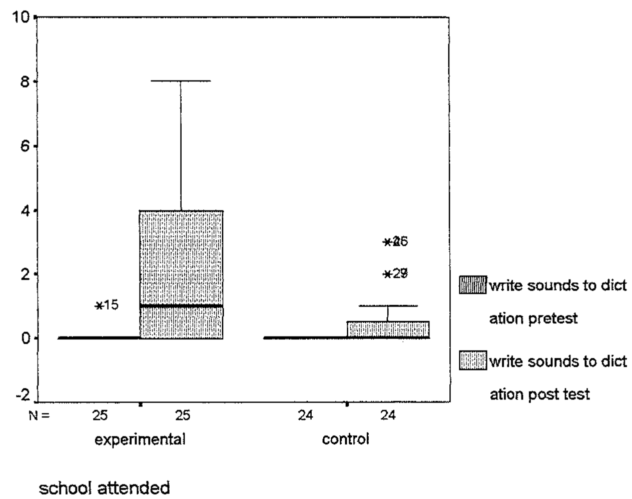
Those experimental children who arrived at nursery with a tentative grasp of phoneme awareness and alphabet knowledge developed rapidly with the intervention training. In comparison the children in the control group who arrived in nursery with a similar awareness and knowledge made very little progress in literacy foundation skills throughout their nursery year. It is therefore hoped that the remainder of the experimental children, who have now been made aware of the sounds in spoken words and the existence of the corresponding letters that can combine into written words, will be able to develop rapidly once they are receiving formal literacy instruction in the Reception Year.

As pointed out in the design section, the purpose of the intervention was to model the principle of written language for children, who in the main came from a less advantaged environment. This is a principle that the more advantaged children bring with them to school. It was not expected at this stage that the children would learn and remember all the information given to them but it was hoped that, (i) they would develop awareness that their language was made up of a finite number of sounds, and (ii) prior to formal literacy instruction in school they would be aware that written language was the process of mapping this set of sounds onto symbols in a reasonably systematic way. It was also flagged up that there were tricky bits that they would learn about later. It would therefore be expected that from their very first encounter with the alphabet in school, they would have an implicit understanding that its purpose is to enable them to write and read what they can say. Also, they will have a range of memories that should enhance their ability to learn and retain written language instruction, and above all they should remember that it was stress free and fun.

Write sounds.

Fifteen children in the experimental group could write between 1 and 8 sounds to dictation compared with 6 children in the control group who could only write between 1 and 3 sounds. This difference was significant (mean E = 2.48, SD 2.86; mean C = 0.5, SD 0.98; z=-2.698, p<.007). The child with the baseline outlying score (Figure 6:22) in the experimental group, (who could write the sound /m/ that was in her name), was one of two children to score 8 at PT1.

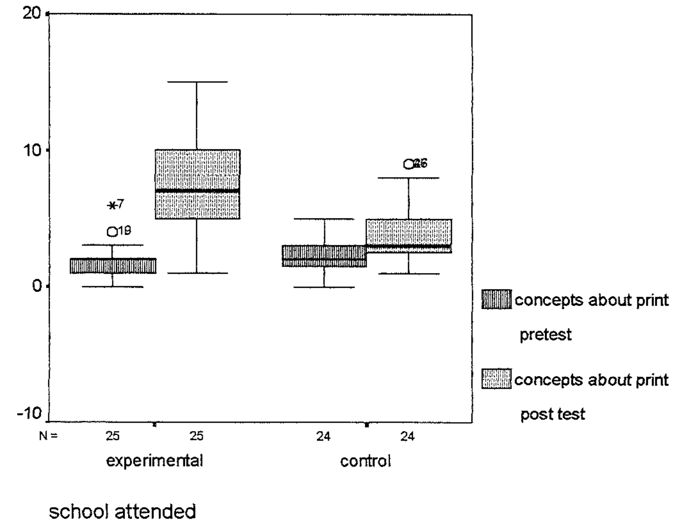
<u>**Figure. 6:22.** Pre and PT1 Scores of Writing Sounds to Dictation.</u>



Reading.

Concepts about Print. The concepts about print measure, again reveals some qualitative differences that are not immediately apparent in the overall significant result (mean E = 8.16, SD 4.29; mean C = 3.88, SD 2.27; z=-3.703, p<.000).

Figure 6:23. Pre and PT1 Outcomes of Concepts About Print.



The questions in the concepts about print test can be grouped into 3 levels of knowledge; 1, general knowledge about books, 2, general knowledge about the print, and 3, more detailed knowledge about words and print conventions. The individual items in the concepts about print measure were analysed using a chi square test.

Item Analysis of Concepts about Print

1) *General knowledge about books.*

Table 6:7.: *General Knowledge about Books at Baseline and PT1.*

	Baseline.				PT1		
General knowledge about books.	E	C	Sig.		E	C	Sig.
Front of book.	15	18	ns		20	19	ns
Bottom of picture.	16	17	ns		23	14	p<.007
Left before right page (Confusing).	0	0	ns		3	2	ns

It can be seen in Table 6:7 that equal numbers of children in each group could identify the front of the book at baseline and PT1. The 'left before right page' item was very confusing with the picture and a few lines of writing that could be taken for a caption on the left and uninterrupted text on the right. This is perhaps why very few children scored on this item even at PT1. The significant result at PT1 for the *bottom of the picture* (which is upside down) is difficult to interpret. One possible explanation is that it could be due to the control teacher's 'big book' style of teaching where she often refers to the bottom of the *page* and the children have confused that with the bottom of the *picture.*

2) General knowledge about print.

The children are evenly matched at PT1 on the first 4 items (see Table 6:7a). The groups are equal in their ability to point to a word, a letter or a capital letter, and a few children recognised when the print was upside down. But when asked specifically which was the first and last letter in a word the experimental children were significantly better than the control children.

Table 6:7a. Knowledge about Print at Baseline and PT1.

	Baseline				PT1		
Knowledge about print.	**E**	**C**	**Sig.**		**E**	**C**	**Sig.**
Isolate letters	4	5	ns		20	17	ns
Isolate words	0	0	ns		9	10	ns
Inverted print	0	0	ns		3	1	ns
Capital letter	0	0	ns		5	1	ns
First and last letter in word	0	0	ns		15	6	p<.014
Story in print not picture	9	8	ns		20	10	p<.007
Start reading top left	1	1	ns		16	3	p<.000
Move from left to right	1	3	ns		14	4	p<.005
Return sweep to next line	1	1	ns		13	3	p<.004
Beginning and end of story	0	0	ns		12	2	p<.002

Although 9 experimental and 8 control children knew at baseline that the print carried the story, a further 11 experimental children realised this at PT1 (a total of 80%), as opposed to an increase of 2 control children (a total of 42%). This is surprising given that the control school places great emphasis on a general understanding of 'real books' as a literacy foundation. The experimental children were also significantly better in their knowledge of the direction of the print and of where the story began and ended. (see Table 6:7a).

3) Detailed knowledge about words and print conventions.

There were significant advantages for the experimental children at a deeper level of knowledge about words and print conventions. For example the first 3 items in Table 6:7b showed that 14 (56%) of the experimental children recognised a full stop, 4 (16%) experimental children recognised a question mark and 7 (28%) were able to find 2 lower case letters equivalent to 2 upper case letters. Of the other measures, three experimental children and 1 control child could point to each word as it was read but this was a non-significant difference. One child in the experimental group recognised that the line sequence was the wrong way round. There was a clue in the fact that the first line ended in a full stop and the second line started with a capital letter as well as text being read aloud in correct order by the experimenter. The final 6 items in Table 6:7b were beyond the ability of these children at the end of their nursery year.

Table 6:7b. Knowledge about words and print conventions at Baseline and PT1.

	Baseline.				**PT1**		
Knowledge about text.	E	C	Sig.		E	C	Sig.
Question mark	0	0	ns		4	0	jns
Full Stop	0	0	ns		14	0	p<.000
Upper and lower case letters	0	0	ns		7	0	P<.006
Point at each word as it is read	0	0	ns		3	1	ns
Incorrect line order	0	0	ns		1	0	ns
Incorrect word order	0	0	ns		0	0	ns
Incorrect letter order	0	0	ns		0	0	ns
Reversible words (was/no)	0	0	ns		0	0	ns
Quotation marks	0	0	ns		0	0	ns
Comma	0	0	ns		0	0	ns
Incorrect spelling.	0	0	ns		0	0	ns

These results seem to suggest that the intervention in the experimental group had given the children a deeper understanding of print concepts, despite the fact that the control group had a very regular and structured big book reading programme.

BAS Reading Test.

Most of the children were still unable to read any words on the BAS single word reading test (mean E = 0.56, SD 1.58; mean C = 0.21, SD 1.02; z=-.969, ns). However, 3 experimental children could read between 4 and 6 words and 1 control child read 5 words. Again qualitative differences were evident in that the experimental children often pronounced the first sounds of the words but failed to read them correctly. For 'the', for example, some children would say /th/, or for 'fish' /sh/. The word 'up' would be segmented into /u/, /p/, but not blended back into the word and many children would pick out a well known letter like /ks/ in 'box'. The control children were unable to respond with any of these literacy skills.

Young's Reading Test.

Nine children (36%) in the experimental group and 4 (17%) in the control group achieved a 'reading age' in the Young's Reading Test where they had to circle a word that corresponded to a picture. A chi square test revealed that this result was not significant. Once more, the qualitative difference between the groups is evident as the experimental children were using their knowledge of letter sounds to make educated guesses at choosing the correct word from 3-5 others. For example, they would initially sound out the first letter of the word, (/s/ for sun). When that strategy failed because all the word choices began with the same letter, some children would pronounce the word slowly as they examined the list of 5 words and pick out the /b/ in table, the /l/ in wheel or the /k/ in snake.

Read Regular and Irregular Words.

The same children who could read words in the BAS reading test, plus one other control child, could read some words in the non-standard reading test (mean E = 0.68, SD 1.89; mean C = 0.21, SD 0.83; z=-.533, ns). Three children in the experimental group read between 5 and 6 words and of the 2 control children, 1 read 1 word and the other 4 words. In both the BAS reading test and the non-standard reading test the experimental children were qualitatively different from the control children, many of them making all sorts of reasonable attempts to sound out the words. As with the BAS reading test, many children sounded out the first letter of each word or picked out a salient letter. One child segmented and blended the word 'had' but confused /d/ with /b/ and pronounced 'hab'.

Read Non-words.

The same three experimental children read 4, 5, and 7 non-words respectively but many of the other experimental children sounded out some of the phonemes and a few children sounded out all the phonemes, but then blended them together incorrectly. None of the control children could make any attempt at this task (mean E = 0.64, SD 1.82; mean C = 0; $z=-1.733$, ns).

Writing.

Again the same three experimental children wrote 1, 3, and 6 words respectively and a 4th child wrote 3 words. Non of the control children could write any words (mean E = 0.52, SD 1.42; mean C = 0; $z=-2.022$, $p<.043$).

Summary.

In summary, at the end of the nursery year the groups were non-significantly different on all the control measures, except for rhyme awareness, in which the experimental group had the advantage and non-word repetition, in which the control group had the advantage. On the experimental measures there were significant differences beginning to emerge in favour of the experimental group. The experimental group at this intermediate stage were statistically significantly ahead on phoneme segmentation, letter sound recall, write sounds, print concepts and writing. They were also non-significantly ahead of the control group on all the remaining experimental measures and showed positive qualitative differences that should feed into their formal tuition in the Reception year and become evident in the final, 'end of Reception Year' results.

Chapter 7.

One Year On.

The final range of post-tests (PT2) was carried out at the end of the Reception Year, with testing beginning in May 1999. The mean age of the children when these measures were taken was 5 years and 2 months. For the Reception Year, the experimental group had been divided between two reception classes. Twelve experimental children joined 14 other children in Red Class and 13 experimental children joined 14 other children in Blue Class. The full range of measures was also taken from the 'in class' additional children, half of which were newly arrived reception children and half of which were 'Year 1' children who were repeating their reception year with an extra hour of more advanced literacy instruction. This was the first year of the NLS and the introduction of the literacy hour, so in the following chapter, differences will be examined between the 'in class' additional children in the experimental school and the experimental and control groups, who were all subject to this new regime. This chapter will be concerned with the final analyses between the experimental and control groups.

Table 7:E shows that there were no significant differences between the experimental and control groups on any of the control measures. The tests in which the groups had differed at PT1 will be examined and tentative conclusions will be drawn regarding the problems for phonological and visual memory which were explored in the previous chapter. At PT1 the experimental group was statistically significantly ahead of the control group on only a few of the experimental measures but showed considerable qualitative differences in their phonemic awareness, gpc knowledge and segmenting and blending ability. It was expected that their enhanced awareness of these literacy measures would enable them to take full advantage of their formal literacy training in

the reception class and the statistical analyses of experimental measures demonstrate that this may have been the case. Unless otherwise stated, the results were analysed using the non-parametric Mann Whitney Test.

Table 7:E Control Measures. Post Test 2, End of Reception.

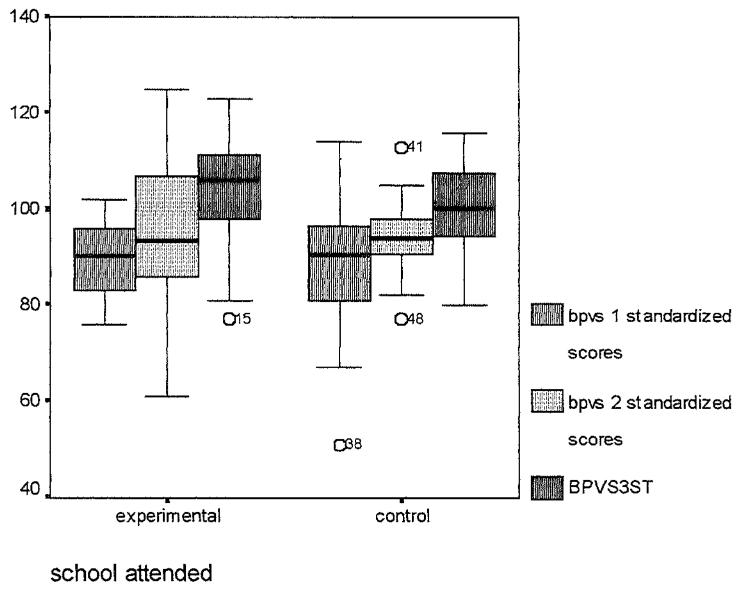
Oral Language		**N25**	**N24**		
		Exp.	**Cont.**	**Stat.**	**Prob.**
BPVS Standardised Scores	Mean	102.44	98.13		
	SD	12.24	14.14	z=-1.161	ns
Morphological Awareness	Mean	8.6	7.29		
'Wugs' Maximum score 20	SD	3.75	2.33	z=-1.432	ns
Auditory Perception					
Auditory Disc. & Attention Test	Mean	4.44	3.58		
(Raw error scores) 17 items	SD	4.61	3.46	z=-.564	ns
Rhyme Detection (10/12)	Freq.	n19(76%)	n12(50%)	chi 3.489	ns
Phonological Memory					
Word Repetition	Mean	14.92	14.79		
Maximum Score 15	SD	0.28	0.41	z=-1.270	ns
Non-word Repetition	Mean	14.64	14.54		
Maximum Score 15	SD	0.91	0.88	z=-.678	ns
Digit Span Test	Mean	3.72	3.17		
Maximum Score 7	SD	1.14	0.92	z=-1.936	ns
Visual Memory					
Greek Letter Memory Test	Mean	5.28	5.54		
Maximum score 12	SD	2.88	3.11	z=-.483	ns
Alphabet Knowledge					
Letter Name Recognition	Mean	24.32	22.79		
Maximum score 26	SD	3.4	5.27	z=-1.065	ns
Letter Name Recall	Mean	21.84	21.33		
Maximum score 26	SD	6.51	6.35	z=-.960	ns
Mathematics					
BAS Number Skills	Mean	20.56	18.54		
Maximum score 36	SD	4.43	5.81	z=-1.068	ns

Control Measures.

Oral Language.

BPVS.

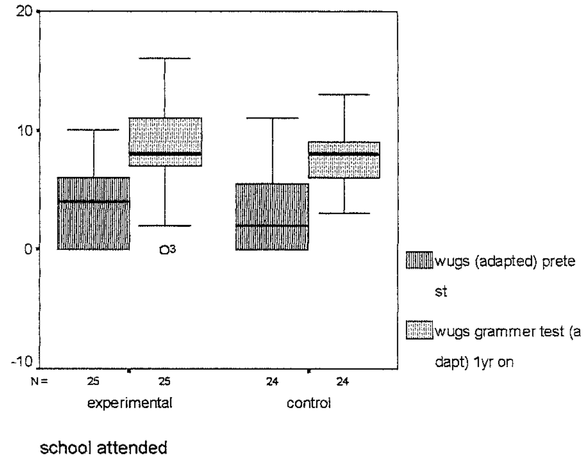
Figure 7:24.Pre, PT1 & PT2 Measures of Oral Language. BPVS.



The mean standard scores for the BPVS have increased significantly for both groups from PT1 to PT2, (E by 7.32, z=-2.935, p<.003 and C by 3.96, z=-2.130, p<.033), and there is still no statistically significant difference between the groups at the end of their Reception year, at PT2 (mean E = 102.44, SD 12.24, mean C = 98.13, SD 14.14; z=-1.161, ns). The low outlier at PT1, in the experimental group (Figure 7:24) is the score of an extremely disadvantaged English girl, who flourished throughout the intervention and whose scores on phonics knowledge, reading and writing are amongst the highest.

Morphological Awareness.

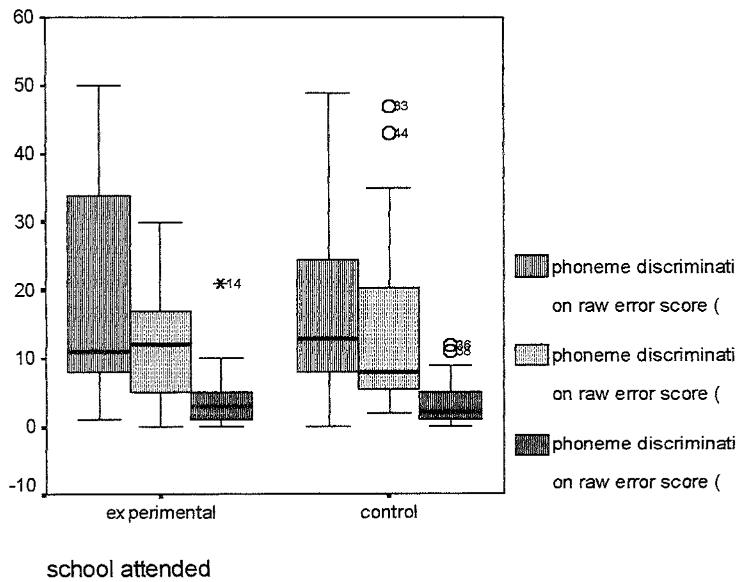
Figure 7:24a. Baseline and PT2 Measures of Morphological Awareness.



The two groups were also evenly matched on their awareness of the morphological structure of language at PT2, (mean E =8.6, SD 3.75, mean C = 7.29, SD 2.33; z=-1.432, ns). As would be expected over a period of 1 year and 7 months, the mean scores for both groups have increased significantly from baseline to the end of the Reception year, (E by 5.36, z=-4.115, p<.000, and C by 3.16, z=-3.666, p<.000). The two measures of oral language, BPVS and Morphological Awareness are highly correlated (r=.482, p<.000).

Auditory Discrimination and Attention.

Figure 7:25.Pre, PT1 & PT2 Measures of Auditory Disc. & Att.: Error Scores.



There was a similar fall in the number of errors made by both groups on the phoneme discrimination and attention test and there were still no statistically significant differences between them at PT2 (mean E = 4.44, SD 4.61, mean C = 3.58, SD 3.46; z=-.564, ns).

Phonological Awareness.

Rhyme Detection.

At PT2, 19 experimental children (76%) and 12 control children (50%) could detect rhyme. (chi 3.489, ns). Although this difference was not statistically significant the control children still had not reached the level of rhyme awareness the experimental children had reached at the end of the intervention at PT1 (E = 56% and C = 21%). The groups had been evenly matched at baseline, (E= 1 child, C= 1 child). In the last chapter Maclean et al's (1987) proposition was discussed, in which it was suggested that children's experience with rhyme led to enhanced phoneme awareness and thus to greater success in learning to read. The results in the present study, at first sight, seem to support this claim, as there were significantly more children in the experimental group who could detect rhyme at PT1 (Pearson's Chi Square Test = 6.578, df1, P<.010), and this group went on to be significantly better readers than the controls at PT2 (see Table F). However, with the results of the experimental measures taken together at PT1, it would be fair to claim that between baseline and PT1, the gpc and phoneme awareness training enhanced the experimental children's awareness of rhyme, not the other way round. If Maclean et al (1987) were correct, that experience with rhyme increases phoneme awareness leading to greater success in learning to read, the rhyme awareness scores for both groups at PT1 should correlate with reading ability at PT2. Although for the experimental group, rhyme awareness at PT1 predicts the ability to read words on the BAS Single Word Reading Test at PT2 ($r=.399$, $p<.048$), for the control group there was no correlation at all between rhyme awareness at PT1 and the ability to read at PT2, ($r=.073$, ns) even though there had been a strong focus on rhyme throughout their nursery year. Although half the control group could detect rhyme at PT2, there was still no correlation with their concurrent ability to read words on the BAS reading test ($r= .110$, ns). In addition, for the experimental group, (as shall be seen in the experimental measures section) the correlation between letter sound recall at PT1 ($r=.745$, $p<.000$) or letter name recall at PT1 ($r=.809$, $p<.000$) and the BAS reading measure at PT2, was much stronger than the association between rhyme at PT1 and reading at PT2, suggesting that it was the knowledge gained through the intervention that enabled their superior reading ability. There were similar associations for the control group between letter sound recall at PT1 ($r=.801$, $p<.000$) and letter name recall at PT1, ($r=.852$, $p<.000$) and the BAS Reading Test at PT2.

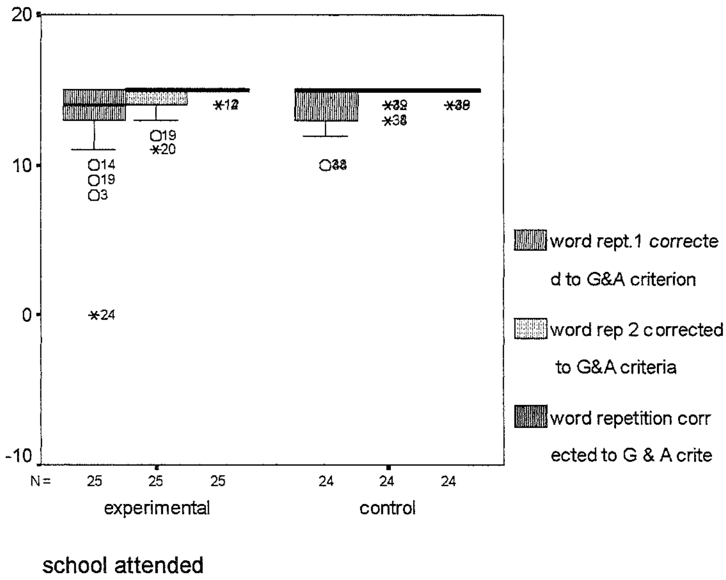
In summary, it appears that for the experimental group the gpc training enhanced both rhyme awareness and reading ability at the end of the nursery year and one year later. But significantly fewer children in the control group, without the gpc training, were aware of rhyme at PT1, and many of these were still unaware of rhyme at PT2. Although there were no correlations between these children's ability to rhyme at any stage and their ability to read, there were correlations between their alphabet and gpc knowledge and reading ability at the end of the Reception year. These results would seem to indicate that it was phoneme awareness and alphabet knowledge that lead to both the rhyme awareness and successful reading, rather than successful reading developing from a foundation of rhyme awareness, as Maclean et al (1987) proposed.

Phonological Memory.

Word Repetition.

Most of the children in both groups were able to repeat words at each syllable length at PT2 (mean E = 14.92, SD .28, mean C = 14.79, SD .41; z=-1.270, ns). The few exceptions were children who still had production difficulties with the initial consonant cluster of *squirrel* or had problems of assimilation with *mokerbike.*

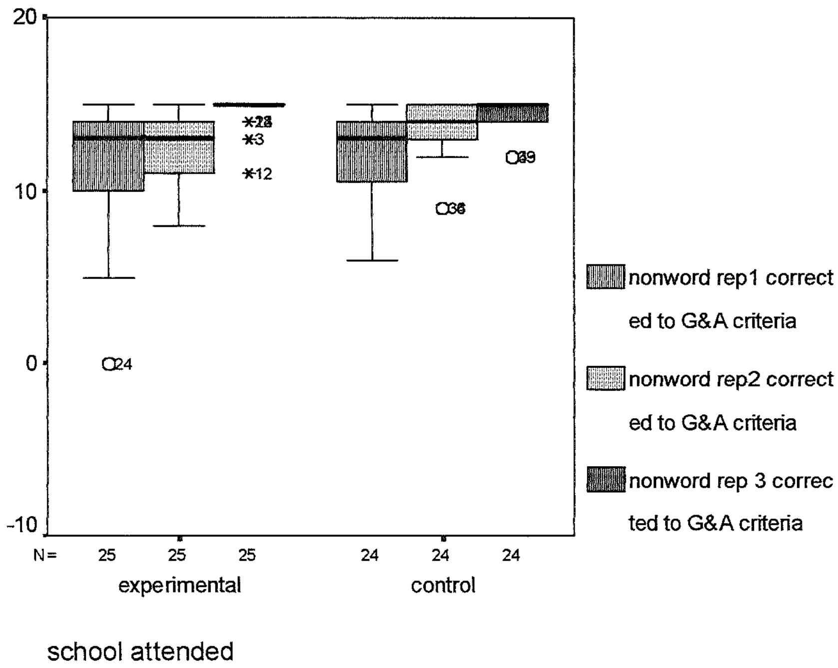
Figure 7:26. Pre, PT1 & PT2 Measures of Phonological Memory. Word Repetition.



Non-word Repetition.

Figure 7:26a shows a further improvement for both groups who are at ceiling in non-word repetition with no statistically significant difference between them at PT2 (mean E = 14.64, SD .91, mean C = 14.58, SD .88; z=-.678, ns). Half the errors made by the children at PT2 could be seen as lexicalisations, e.g. 6 children pronounced *trumperline* for *trumperine* (often indicating that they meant *trampoline*). The remainder of the errors were production difficulties, e.g. misplaced articulation, *clurd* for *plurd, bannop* for *bannock, and dotilate* for *dopilate.*

Figure 7:26a. Pre, PT1 & PT2 Measures of Phonological Memory. Non-Word Repetition.

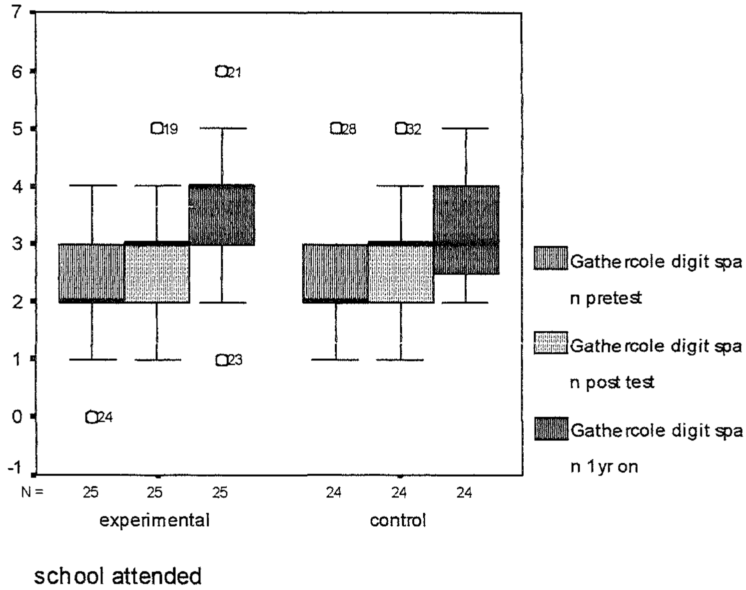


The pattern seen at PT1 remained the same, that is, there was still no correlation between either word or non-word repetition and BPVS, as Gathercole and Adams' (1993) suggestion that there is a special relationship between the two measures would predict.

Digit Span.

The two groups were still well matched on digit span at PT2 (mean E = 3.72, SD 1.14, mean C = 3.17, SD .92; z=-1.936, ns). However, as can be seen in Figure 7:26b, the median score for the experimental group has risen to 4. This corresponds with the repetition of two sets of 5 numbers, compared with the median score of 3 for the control group, corresponding to the ability to repeat two sets of 4 numbers. So although there is no overall statistically significant difference between the groups, the improvement for the experimental group is significant from PT1 to PT2 (z=-3.342, p<.001) whereas the improvement for the control group just misses significance (z=-1.927, ns).

Figure 7:26b. Pre, PT1 & PT2 Measures of Phonological Memory. Digit Span.

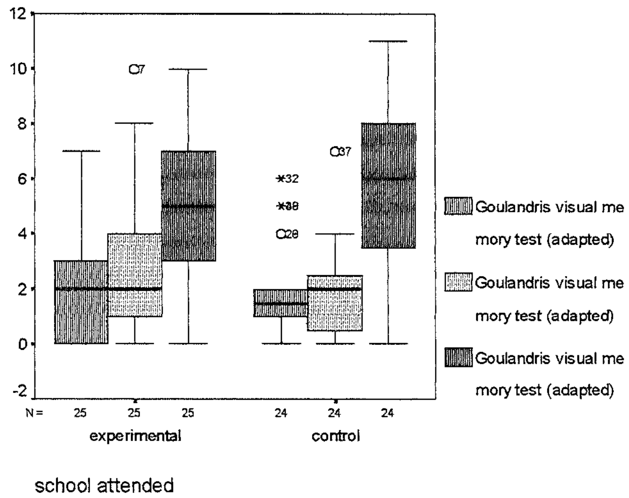


At PT1, digit span was the only phonological memory measure to correlate with the BPVS but at PT2, there was no such association. However, if digit span is a reliable measure of phonological memory, it is possible that an association could be found between the PT2 digit span and PT2 BAS reading scores. Analysis revealed that this association was not significant for the control group (r=.146, ns) but was quite strong for the experimental group (r=.476, p<.016). Taken together with the significant improvement in phonological memory for the experimental group from PT1 to PT2 this suggests that the experimental children's phonological memory is a source of reciprocal influence facilitating both the use of gpc, segmenting and blending strategies in literacy tasks as well as improving phonological memory. The association between a phonological memory measure and reading for the experimental group is especially interesting because the visual memory measure, see below, is more strongly associated with the control group's BAS reading score. This interaction may be indicative of the divergent approaches to literacy acquisition.

Visual Memory.

There are no statistically significant differences between the groups on visual memory at PT2 (mean E = 5.28, SD 2.88, mean C = 5.54, SD 3.11; z=-.483, ns) with similar statistically significant improvements for both groups from PT1 to PT2 (E z=-3.393, p<.001 and C z=-3.939, p<.000) as can be seen in Figure 7:27.

Figure 7:27. Pre, PT1 & PT2 Measures of Visual Memory.



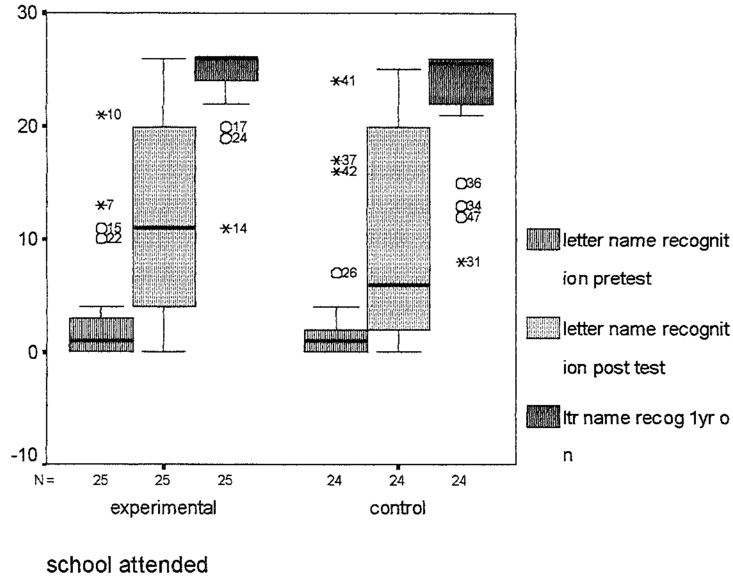
Whereas the experimental group's phonological memory scores correlated with the BAS reading test but the control group's did not, the converse is the case between visual memory scores and the BAS reading test. The control group's visual memory scores correlate with the BAS reading task but the experimental group's do not (E r=.303, ns and C r=.477, p<.019). These results suggest different sources of influence may be operating on the learning of the two groups. For the experimental children, word recognition involved translating the visual stimuli into a phonological code, which is influenced by phoneme awareness and phonological memory and as Vellutino (1979) suggested, leads to successful reading. For the control children, who lacked this strategy, reading involved trying to commit sequences of unfamiliar abstract printed items to memory, which is precisely the ability tested in the Goulandris Visual Memory test. Stuart, Masterson & Dixon (2000) found similar results for a group of non-phonologically aware children. They examined the correlations between visual memory and word learning for two groups of children, at three points as they learned a set of words. One group had gpc skills (GP+) and the other group did not (GP-). At no point were the visual memory scores of the GP+ group associated with word learning but by the final data point, as the GP- group were beginning to learn some words by sight, there was a highly significant correlation with visual memory ($r=0.79$). In this study the visual memory scores for the control group also correlated highly with letter sound recall ($r=.800$, $p<.000$) and to a lesser extent with letter sound recognition ($r=.424$, $p<.039$) but not with letter name recognition and recall which were at ceiling. This supports the proposition that the control children with good letter name knowledge through which they inferred letter sounds were committing these abstract impressions to visual memory. There are no such correlations for the experimental children between visual memory and letter sound recognition and recall or word recognition, suggesting as Vellutino proposed that these children are using a sound-based rather than visual strategy for reading. As with the Stuart et al study (2000), the two groups did not differ significantly in their visual memory scores, which reinforces the view that visual memory is a strategy of last resort for those who have no other available (Stuart & Coltheart, 1988; Stuart, Masterson, & Dixon, 2000).

Alphabet Knowledge.

Letter Name Recognition.

Both groups are approaching ceiling in letter name recognition at PT2 (mean E = 24.32, SD 3.4, mean C = 22.79, SD 5.27; $z=-1.065$, ns) with a slight non-significant advantage for the experimental group who had fewer outliers at the lower end of the range.

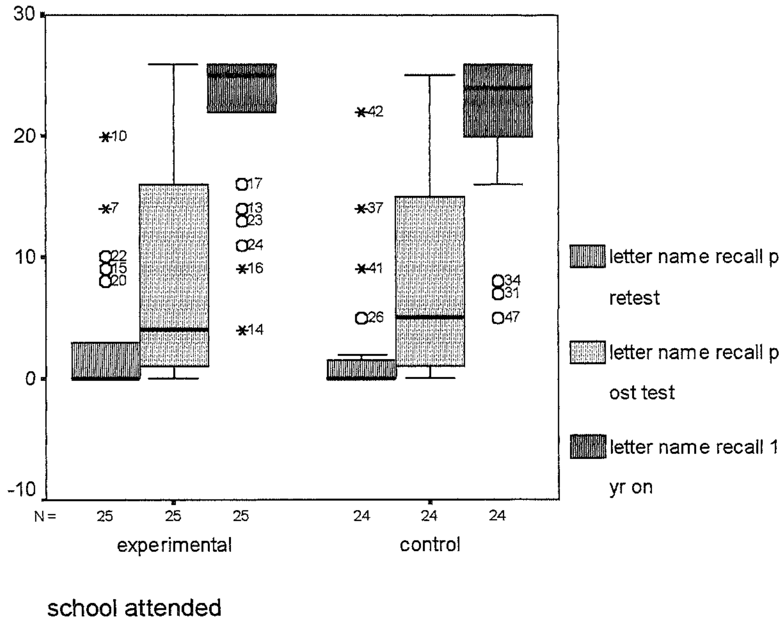
Figure 7:28. Pre, PT1 & PT2 Alphabet Knowledge. Letter Name Recognition.



Letter Name Recall.

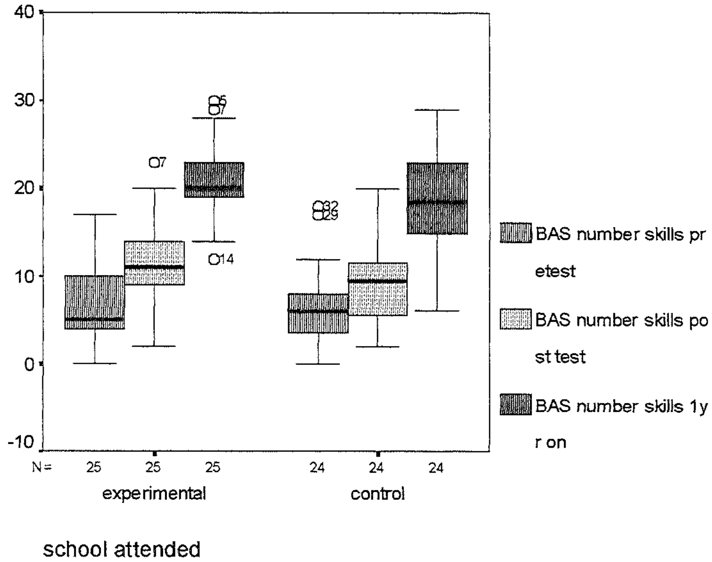
There were no statistically significant differences for letter name recall at PT2 (mean E = 21.84, SD 6.51, mean C = 21.33, SD 6.35, z=-.960, ns). As at PT1 many of the errors made by experimental children were confusions between letter sounds and letter names whereas the errors for the control children were repetitions of the same group of letter names or no response.

Figure 7:28a. Pre, PT1 & PT2 Measures of Alphabet Knowledge. Letter name recall.



BAS Number Skills.

Figure 7:29. Pre, PT1 & PT2 Measures of Number Skills.



Both groups had equally improved in number skills and there was no significant difference between them at PT2 (mean E = 20.56, SD 4.43, mean C = 18.54, SD 5.81, z=-1.063, ns). The non-significant differences between the groups on all the control measures suggest that any significant effects of the intervention will be restricted to literacy skills.

Experimental Measures.

Table 7:F shows that the experimental children are significantly ahead on all the experimental measures. As a group their behaviour was still qualitatively different from the control group.

Table 7:F. Experimental Measures at PT2.

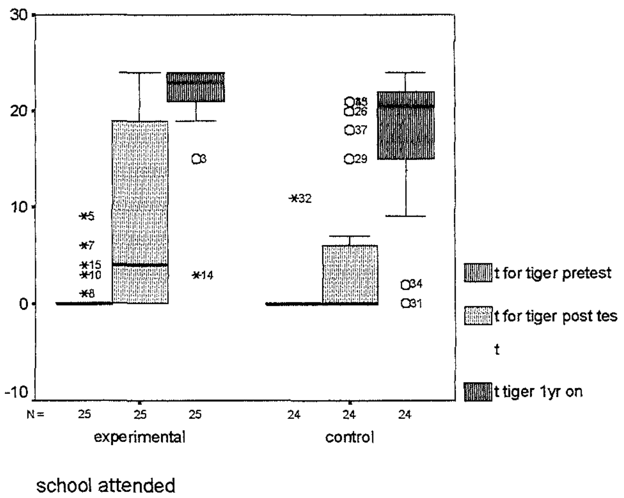
Phoneme Awareness		N 25	N 24		
		Exp.	Control	Stat.	Prob.
Initial Phoneme Identification	Mean	21.8	17.96		
(t for tiger) Maximum score 24	SD	4.46	6.63	z=-3.113	p<.002
Phoneme Segmentation	mean	6.08	3.08		
Maximum score 12	SD	3.13	3.03	z=-3.038	p<.002
Phonic Knowledge					
Letter Sound Recognition	mean	23.36	19.92		
Maximum score 26	SD	5.63	7.23	z=-2.268	p<.023
Letter Sound Recall	mean	23	15.29		
Maximum score 44	SD	9.57	8.48	z=-2.613	p<.009
Write Sounds	mean	7.92	5.33		
Maximum score 10	SD	2.02	2.37	z=-3.718	p<.000
Blending.					
Onset-Rime	mean	10.4	9.29		
Maximum score 12	SD	2.06	1.99	z=-2.165	p<.030
Phonemes	mean	8.88	6.38		
Maximum score 12	SD	2.98	3.12	z=-2.714	p<.007
Reading					
Print Concepts	mean	17.12	13.58		
Maximum score 24	SD	4.94	3.72	z=-2.687	p<.007
Young's Reading Test	freq.	n22 (88%)	n11 (46%)	chi = 9.698	p<.002
Freq. of Reading Age >6yrs					
Read Regular & Irreg. Words	mean	5.52	2.29		
(Non standard) Max. score 12	SD	4.28	3.68	z=-3.295	p<.001
BAS Single Word Reading	mean	17.48	7.48		
Maximum Score 20	SD	15.51	10.48	z=-2.801	p<.005
Read Non-Words	mean	3.04	0.54		
(Non-standard) Max. score 10	SD	4.2	1.69	z=-2.405	p<.016
Read Real Book	Freq.	n11 (44%)	n2 (8%)	chi = 7.991	p<.005
read 4+ pages unaided	Freq.	n18(72%)	n3 (12.5%)	chi = 17.701	p<.000
Writing					
Write Regular & Irreg. Words	mean	4.6	2.21		
Maximum score 10	SD	3.2	2.83	z=-2.787	p<.005

Phoneme Awareness.

Initial Phoneme Identification.

Initial phoneme identification had changed to a statistically significant difference between groups at the end of the Reception year, PT2 (mean E = 21.8, SD 4.46, mean C = 17.96, SD 6.63; z=-3.115, p<.002).

Figure 7:30.Pre, PT1 & PT2 Measures of Initial Phoneme Identification.

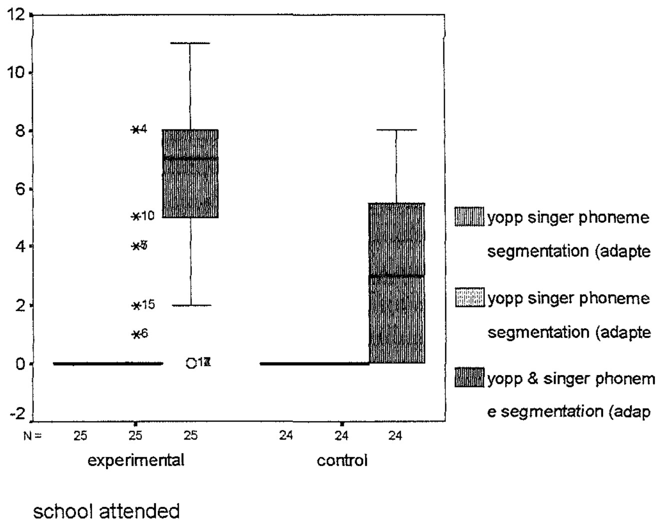


Twelve experimental children (48%) achieved the maximum score of 24, compared with 3 control children (12.5%). The initial phoneme of a word is usually the first phoneme that children become aware of and are able to isolate from the rest of a word. It is therefore an important stage in literacy development. Only 3 experimental children (12%) scored fewer than 20 items out of 24 demonstrating that the majority of them (88%) have acquired a basic level of phoneme awareness that will facilitate reading development. Eleven (nearly half) of the control children scored less than 20 out of 24.

Phoneme Segmentation.

Phoneme segmentation is one of the most difficult phoneme awareness tasks for children at this stage of literacy development. It is not only important for reading for children to be able to segment words into their constituent phonemes, but it is also essential for spelling. At baseline none of the children could manage the task and at PT1, after the intervention, 6 experimental children were able to score. At PT2, the experimental group were significantly better at the task than the control children (mean E = 6.08, SD 3.13, mean C = 3.08, SD 3.03; z=-3.038, p<.002). Figure 7:31 shows that seventeen experimental children (68%) were able to segment at least half the words, compared with 6 control children (25%).

Figure 7:31. Pre, PT1 & PT2 Measures of Phoneme Segmentation.



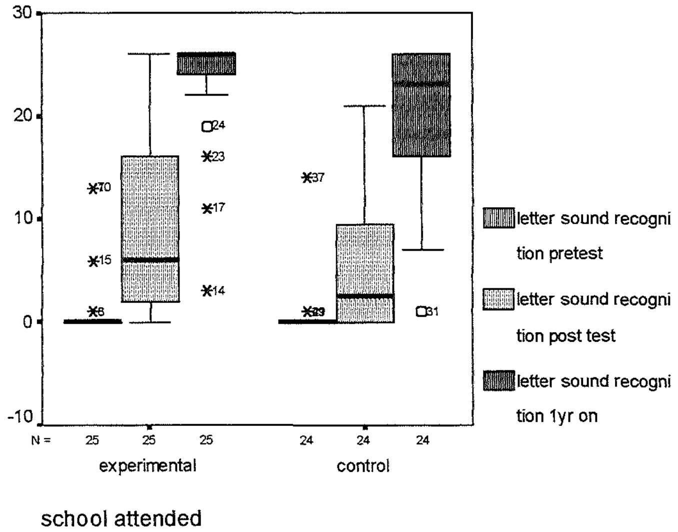
Behaviour was qualitatively different between the groups. The experimental children understood the task and their errors generally arose either because they treated a blend as a single phoneme e.g. /sw/ in *swim*, or because they omitted the second letter in a blend, e.g. the /t/ in *stop* or the /r/ in *green*. The control children, in the main, were still bemused by the task and their errors were either to repeat the word several times, or no response.

Phonic Knowledge.

Letter Sound Recognition.

Figure 7:32 illustrates the statistically significant advantage for the experimental children at PT2 (mean E = 23.36, SD 5.63, mean C = 19.92, SD 7.23; z=-2.268, p<.023) with 16 of the experimental children (64%) scoring the maximum of 26 compared with 8 control children (33%), with scores of 26.

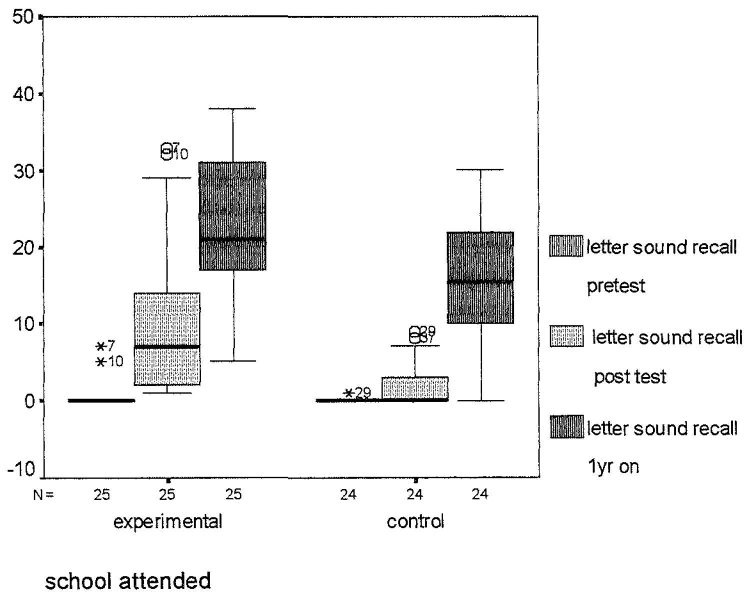
Figure 7:32. Pre, PT1 & PT2 Measures of Letter Sound Recognition.



Letter Sound Recall.

The difference between groups for letter sound recall was also significant (mean E = 23, SD 9.57, mean C = 15.29, SD 8.48; z=-2.613, p<.009) with 11 of the experimental children (44%) recalling a number of digraphs as well as the 26 letters of the alphabet, compared with 1 control child (4%) who was able to pronounce 4 digraphs.

Figure 7:32a. Pre, PT1 & PT2 Measures of Letter Sound Recall.

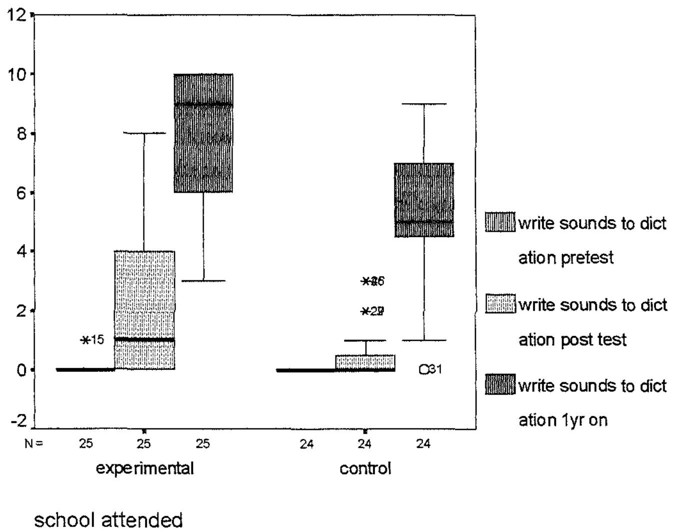


Again the experimental children were confident with the letter sounds whereas the control children were inclined to say the letter name first and then extract the sound.

Write Sounds.

Writing sounds was again subject to qualitative differences with the experimental children making the sound as they wrote it and the control children often saying, for example, 'that's an 'S''.

Figure 7:33. Pre, PT1 & PT2 Measures of Writing Sounds to Dictation.



The statistical differences were significant (mean E = 7.92, SD 2.02, mean C = 5.33, SD 2.37; z=-3.718, p<.000) and 7 of the experimental children (28%) scored the maximum of 10, compared with none of the control children.

Blending.

A new phonological task was introduced at PT2 to assess differences between the groups on their ability to blend sounds into words. Blending and segmenting the sounds within words are vital components of literacy acquisition. Children with letter-sound knowledge have been known to sound out each letter and then pronounce a completely different word. In an example from this study an experimental child sounded out /l/, /oo/, /k/ but produced the word *kipper*. Therefore, letter-sound knowledge alone, without the ability to blend phonemes together, is not sufficient for learning to read.

Blending requires phonological awareness and phonological memory, two skills that are purported to make significant yet distinctive contributions to early literacy (Passenger, Stuart & Terrell 2000). Phonological awareness enables children to recognise and manipulate the sound structure of language (Mattingly, 1972; Torgesen, 1991). And phonological memory is required to hold the component sounds in a short-term store, freeing additional cognitive resources for blending individual sounds together to produce a word, as well as to retrieve its meaning from long-term memory (Wagner et al, 1993). This test was designed to assess the children's phonological blending ability at two levels of phonological awareness. Firstly at a preliminary linguistic level of organisation which is not accessible to conscious awareness, identified by Gombert (1992) as an *epilinguistic* level and secondly at a more advanced *metalinguistic* level which does include awareness and intentional control over linguistic segments. Gombert proposes that a conscious meta level of awareness is built on the basis of a pre-existing unconscious epilinguistic awareness and further, that a meta-level of awareness is an optional development which only occurs if external circumstances demand the establishment of intentional control over speech segments, i.e. when learning read. This proposition is in agreement with Morais et al (1979; Morais, 1991) cited earlier who found that adults who had never learned to read were unable to perform phoneme deletion tasks. Even illiterate poets in rural Portugal, with highly developed level of epilinguistic awareness of rhyming, without the demands of literacy, were unable to carry out phoneme manipulation tasks. Seymour, Duncan, and Bolik (1999) make the point that it cannot be assumed that a child who can perform a task measuring epilinguistic awareness of a sound will also possess a metalinguistic awareness of that sound. They identified two approaches to literacy as follows: firstly, building from an existing unconscious epilinguistic awareness of large phonological units of sound such as rhyme, that are already established and which will subsequently lead to an awareness of phonemes. And secondly, explicitly introducing the lacking conscious meta-awareness level of small units of sound, i.e. phonemes, and subsequently a meta-awareness of larger units, especially rime-based, as they become relevant for lexical organisation (Seymour, 1997). Goswami and Bryant (1990) proposed that awareness of onset and rime units emerged prior to learning to read whereas an awareness of phonemes they suggested, in agreement with Gombert (1992) and Morais (1991), is largely a consequence of reading. Therefore, awareness of onset and rime may be categorised as an unconscious epilinguistic level of phonological awareness and awareness of phonemes may be categorised as a conscious meta-linguistic level of phonological awareness. If this is the case, both groups should find it easier to blend onset and rime units than phonemes but it would be expected that the experimental group should have an advantage for blending phonemes as they have been explicitly introduced to this meta-level of awareness.

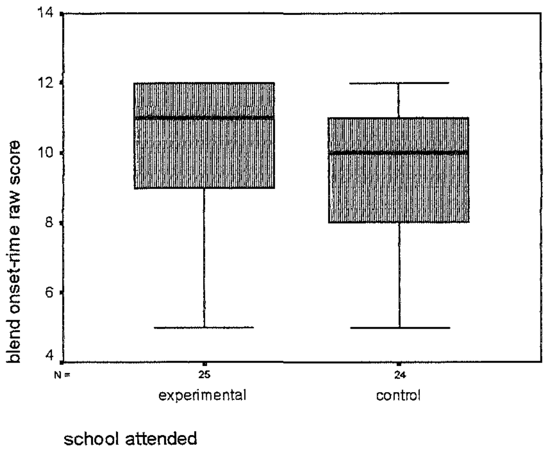
<u>The test (non-standard).</u>

The test (see Appendix 6) comprised a booklet with 24 sets of 3 pictures, randomly assigned to an onset-rime condition and a phoneme condition. Each picture represented an object or action and each set had two objects that began or ended with same phoneme, e.g. *mop, man, bun* or *sock, sun, kick*. After a practice item in each condition the child was asked to "Point to the picture that shows, e.g. /m/, /an/"(onset-rime) or /s/, /o/ /ck/ (phoneme). The order was randomised but presented in the same order for each child.

Onset & Rime.

The control group was good at blending onset and rime but the experimental group were significantly better at the task, (mean E = 10.4, SD 2.06, mean C = 9.29, SD 1.99; $z=-2.165$, $p<.030$). Eleven of the experimental children achieved the maximum score of 12, compared with only 4 control children as illustrated in figure 7:34 and conversely, only 4 experimental children had low scores under nine compared with 11 control children.

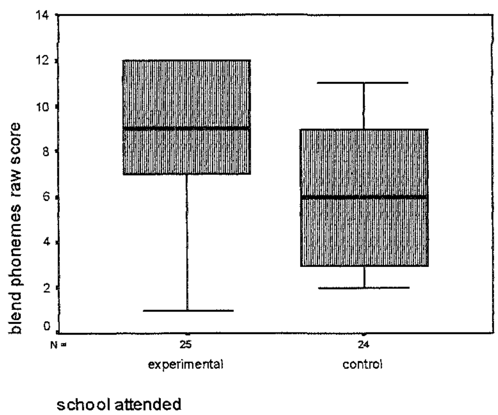
<u>**Figure 7:34**. PT2 Measures of Blending Onset and Rimes into Words.</u>



Phonemes.

Blending phonemes into words was found to be more difficult for both groups than blending onset and rime, as would be expected by the epi- and meta- linguistic distinction between the two levels of awareness.

<u>**Figure 7:34a**. PT2 Measures of Blending Phonemes into Words.</u>



However, as figure 7:34a illustrates, the experimental group were significantly more able to carry out this task (mean E = 8.88, SD 2.98, mean C = 6.38, SD 3.12; $z=-2.714$, $p<.007$). Seven of the experimental children achieved the maximum score of 12 compared with none of the control children and 60% of the experimental children achieved a score greater than nine, compared with 33% of the control group. Both groups were significantly better at blending onset-rime units than phonemes (E z=-3.313, p<.001, C z=-4.206, p<.000) which seems to support Goswami and Bryant's (1990) proposal that awareness of onset and rime emerges prior to learning to read and could therefore interact with text to aid reading development. However, the experimental children's superior performance on both tasks seems to support the second approach to literacy acquisition outlined by Seymour et al (1999) as it appears that literacy development is enhanced by introducing to pre-literate children the phonological awareness level that they lack, i.e. phonemes. Also, it is not only the size of linguistic unit that is important for literacy development but also the operation (i.e. blending) on the linguistic unit that is required for reading. In the course of introducing the experimental children to gpc's they were also encouraged to blend them into words and this experience with blending seems to have led to better performance at both phoneme blending as well as blending the unpractised units of onset and rime.

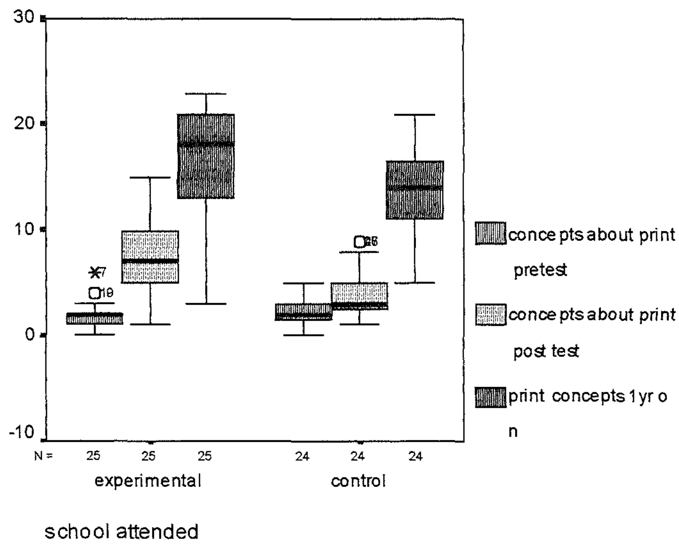
In this study the experimental children 's significantly higher phoneme blending scores correlate highly with their BAS reading scores at PT2 (r=.593, p<.002) and the control group's phoneme blending scores also correlate with their BAS reading scores (r=.471, p<.020) but more modestly. The correlations between onset and rime blending and BAS reading were equally strong for both groups (E = r.507, p<.010 and C = r.504, p<.012). It is therefore likely that blending has a causal relationship with reading. It remains to be seen if the superior blending of both phonemes and onset-rime units for the experimental group will lead to superior reading ability. Both blending tasks were highly correlated with phonological awareness tasks, i.e. initial phoneme identification and segmentation, to at least the .000 level of significance. Phonological memory as measured by digit span correlated only with phoneme blending to the .038 level of significance which is interesting as phoneme blending required a 3 or 4 item recall (t-oa-s-t), whereas onset and rime required only memory for two items (b-us).

Reading.

Concepts About Print.

As at PT1, the statistically significant difference between the two groups (mean E = 17.12, SD 4.94, mean C = 13.58, SD 3.72; $z=-2.678$, $p<.007$) does not reveal the qualitative differences in behaviour that are evident on closer inspection of the data. In the previous chapter, the questions in the concepts about print test were grouped into 3 levels of knowledge; 1, general knowledge about books, 2, general knowledge about print and 3, more detailed knowledge about words and print conventions.

Figure 7:35. Pre, PT1 & PT2 Concepts about Print.



Starting from baseline with no significant differences at any level in the test, it can be seen in Tables 7:8, 7:8a, and 7:8b that the experimental group moved ahead at the end of the nursery year, PT1, on the second level of difficulty, general knowledge about print. By the end of the Reception year, PT2, the control children had caught up at the second level, but the experimental children were now significantly more knowledgeable about the print concepts at the third level, involving a more detailed knowledge about words and print conventions. This would suggest that the experimental group has been able to build on their early foundation of literacy knowledge and take maximum advantage of their formal literacy teaching in school.

Item Analysis of Concepts about Print:

Table 7:8 General Knowledge about Books at Baseline, PT1 and PT2.

	Baseline.			PT1			PT2		
General knowledge	E	C	Sig.	E	C	Sig.	E	C	Sig.
Front of book.	15	18	ns	20	19	ns	24	24	ns
Bottom of picture.	16	17	ns	23	14	p<.007	21	24	ns
Left before right page (confusing)	0	0	ns	3	2	ns	2	0	ns

Table 7:8a. Knowledge about Print at Baseline, PT1 and PT2.

	Baseline			PT1			PT2		
Knowledge about print.	E	C	Sig.	E	C	Sig.	E	C	Sig.
Isolate letters	4	5	ns	20	17	ns	24	23	ns
Isolate words	0	0	ns	9	10	ns	23	21	ns
Inverted print	0	0	ns	3	1	ns	21	16	ns
Capital letter	0	0	ns	5	1	ns	18	14	ns
First and last letter in word	0	0	ns	15	6	p<.014	19	17	ns
Story in print not picture	9	8	ns	20	10	p<.007	24	21	ns
Start reading top left	1	1	ns	16	3	p<.000	25	22	ns
Move from left to right	1	3	ns	14	4	p<.005	25	22	ns
Return sweep to next line	1	1	ns	13	3	p<.004	24	21	ns
Beginning and end of story	0	0	ns	12	2	p<.002	23	15	p<.013

Table 7:8b. Knowledge about words and print conventions at Baseline, PT1 and PT2.

	Baseline.			PT1			PT2		
Knowledge about text.	E	C	Sig.	E	C	Sig.	E	C	Sig.
Question mark	0	0	ns	4	0	jns	20	19	ns
Full Stop	0	0	ns	14	0	p<.000	22	23	ns
Upper-lower case letters	0	0	ns	7	0	p<.006	24	17	p<.017
Point toword as it is read	0	0	ns	3	1	ns	17	9	p<.031
Incorrect line order	0	0	ns	1	0	ns	9	2	p<.020
Incorrect word order	0	0	ns	0	0	ns	6	0	p<.010
Incorrect letter order	0	0	ns	0	0	ns	11	3	p<.009
Reversible words (was/no)	0	0	ns	0	0	ns	19	9	p<.006
Quotation marks	0	0	ns	0	0	ns	15	3	p<.001
Comma	0	0	ns	0	0	ns	1	0	ns
Incorrect spelling.	0	0	ns	0	0	ns	1	0	ns

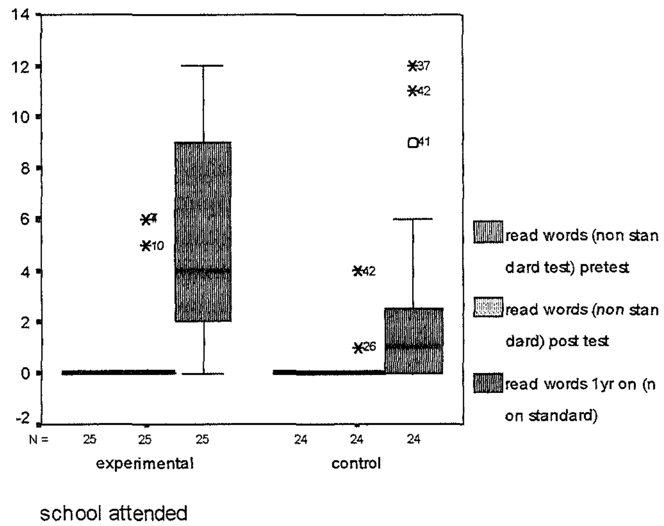
These results would seem to suggest that the experimental group's introduction to phoneme awareness and gpc's together with the modelling of reading and writing for 8 weeks, offered a better foundation for access to books and print, than the control group's structured reading programme with a focus on rhyme and unstructured introduction to alphabet knowledge.

Young Reading Test.

A score of 11 out of 15 on the Young's Reading Test gives a reading age of over 6 years. Twice as many experimental children (22-88%) as control children (11-46%) achieved this reading age either by using the strategy outlined at PT1, i.e. searching for salient phonemes, or by reading the words. This difference is statistically significant (Pearson's chi square test = 9.900, df1, $p<.002$).

Read Regular and Irregular Words.

Figure 7:36.Pre, PT1 & PT2 Measures of Non Standard Word Reading.



Only 2 experimental children were unable to read any words. One of these children has a consistent low score on most of the tests as he is disengaged from the class, living in a world of his own. At nursery he was categorised as a loner and it was thought amusing that he always wore a peaked cap even, according to his mother, to bed. In the Reception class, however, his behaviour is cause for concern and he was waiting for assessment. The other child is a restless, lively child who would rather talk about 'going out in the van with his dad and his mates' and ask endless questions, than be tested. He kept glancing at the word page as he restlessly moved about asking questions about this and that and threw out words like 'ink' and 'joke' to tease the tester. However, he read 6 words on the BAS reading test and also read the 'real book' unaided. This suggests that the intervention helped most of the children to make a start on reading. Eleven control children (45.8%) were unable to read any words at PT2, although 5 of these could read '*the*' in the BAS reading test. There were 6 regular phonetically pronounceable words and 6 irregular words in this test and the experimental children were significantly better than the controls at reading them because, in general, they sounded out and blended the words (mean E = 5.52, SD 4.28, mean C = 2.29, SD 3.68; $z=-3.295$, $p<.001$). Occasionally the experimental children would sound out a word but be unable to blend it, e.g. /i/,/t/ or /i/,/n/ and sometimes this would be because it was irregular, e.g. /d/,/o/ does not say '*doo*' and 3 children wondered if it said '*door*'. But even for irregular words they were often able to adjust the pronunciation of, e.g. the blended /sh/,/e/ into the recognisable word '*she*' or /o/,/f/ into '*of*'. The control children did not have any strategies beyond occasionally naming the letters in the word or guessing any word in their reading vocabulary that began with the same letter. Two control children remarked on the 'Y' at the end of '*they*'. One suggested that the word was too long, 'it shouldn't have *that* on the end' and the other went further pointing out that 'if it didn't have *that* on the end it would be '*the*''.

Tables 7:9 and 7:9a give a breakdown of errors for the two sets of words. It had been expected that there would be an interaction between the regular and irregular words, with the experimental children reading more regular words and the control children reading more irregular high frequency words. However, this was not the case, as more children in both groups read more regular words than irregular words (mean E regular words = 3.20, SD 2.14; mean E irregular words = 2.36, SD2.20; $z=-3.666$, $p<.000$), and (mean C regular words = 1.25, SD 1.82; mean C irregular words = .96, SD 1.92; $z=-2.111$, $p<.035$) and the difference between the groups was significant as the experimental children were more able to analyse and pronounce both sets of words, regular words ($z=-3.441$,$p<.001$) and for irregular words ($z=-2.831$, $p<.005$). There were no significant differences in the number of substitutions made by each group that would give a clear cut indication of the use of a lexical route to word recognition by the control group, but there were differences in the number of 'no' responses between the groups. For both groups significantly fewer 'no' responses were given for regular words than irregular words to at least the .01 level of significance but the experimental group had significantly fewer 'no' responses than the control group on both sets of words, for regular words (mean E = 1.76, SD 1.76, mean C = 3.71, SD 2.27; $z=-2.922$, $p<.003$) and for irregular words (mean E = 2.56, SD 2.45, mean C = 4.29, SD 2.27; $z=-2.636$, $p<.008$). There were 8 unsuccessful segmentations in the experimental errors (2 for regular words and 6 for irregular words) compared with none for the control group who either knew the word or did not. There were 6 occasions where correct segmentation led to faulty blending of sounds into words e.g. /d/, /o/ *door*, or /h/, /a/, /d/ *dad*, in the experimental group, none in the control group. Fifteen of the errors for the experimental group involved giving an appropriate sound for a word compared with 1 control error. On the other hand the experimental group's errors never included a letter name whereas the control group's errors included naming letters on 9 occasions. The data reveals that the experimental group read more words by analysis than the control group and their errors showed novice-reading skills including unsuccessful or incomplete segmentations, or correct segmentation leading to faulty blending, which suggests they were able to use a sub-lexical route for reading. The control group demonstrated none of these novice-reading skills or word recognition strategies. They either knew the word or substituted a word that often began with the same initial phoneme or gave a 'no' response, suggesting that they were reliant on a direct lexical route for reading. These results, more than any other illustrate that the experimental group have their 'word-attack' skills in place, ready to take advantage of any literacy teaching method they may encounter. Whereas the control group still have to learn the basics, as simply recognising words by sight is not a good enough strategy to carry them forward in reading and especially in writing and spelling. As Stuart and Coltheart (1988) suggested, visually based logographic reading may exist, but only as a default strategy for those phonologically unaware children with no other options available.

Table 7:9. Error analysis of Regular Word Reading at PT2.

Regular	it		got		look		in		had		with	
	Exp.	Cont.	Exp	Cont.	Exp.	Cont.	Exp.	Cont.	Exp	Cont.	Exp.	Cont.
Correct	19	7	11	2	19	10	15	8	10	3	6	2
No response	2	14	11	18	4	10	2	11	11	20	15	16
Segmented	/i//t/						/i//n/					
Blend error			goat						dad			
									head			
Letter names and sounds	2 x /t/	P		YOT		L/oo/K	2 x /n/	I N	/d/			
		R					/i/					
		J T										
Substitutes	ink		joke	gate	kind	like	ink	we	an	he	2x went	2x we
			go	2x goat	kipper	off	lid	and			Yacht	was
						on	on	on				when
							it	it				

(Letter names and sounds notation; lowcase letters, e.g. /t/ = phonemes or syllables; capital letters e.g. YOT = letter names).

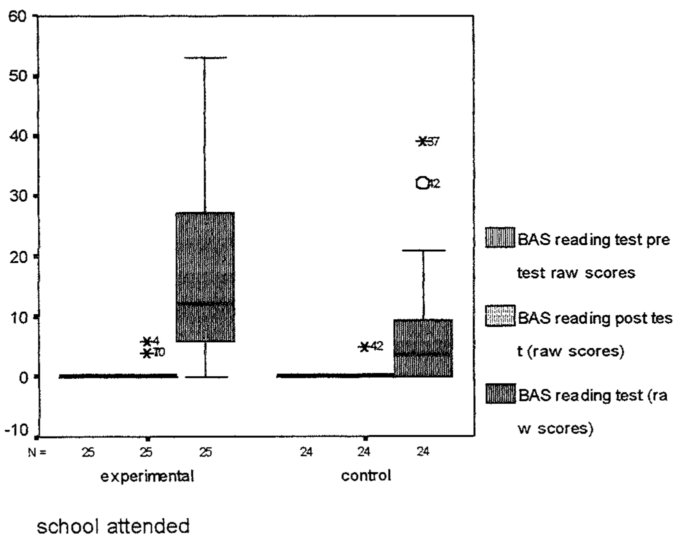
Table 7:9a. Error analysis for Irregular Word Reading at PT2.

Irregular	they Exp.	they Cont	do Exp.	do Cont.	some Exp.	some Cont.	she Exp.	she Cont.	you Exp.	you Cont.	of Exp.	of Cont.
Correct	12	3	5	4	8	2	14	3	12	5	14	6
No response	11	16	11	18	15	20	8	15	11	18	8	16
Segmented			7 x /d//o/		/s/o/m/e/						/o//f/	
Blend Error			3x door									
Letter names	/y/		/d/		/ep/		/s/	2x SHE	/y/			F
and sounds	/w/		/b/				/ip/		/w/			
Substitutes		then		day	she	sun	sheep	sock		when	to	up
		up		down		sam	he	sing			all	
		this						the				
		the						we				

BAS Single Word Reading.

There was a statistically significant result for BAS reading (raw scores) at PT2 (mean E = 17.48, SD 15.51, mean C = 7.48, SD 10.48; z=-2.801, p<.005), with the advantage for the experimental group. Only two of the experimental group were unable to read any words on the test, the first being the same child, mentioned above, who was waiting for assessment, the other did read two words on the non-standard reading test.

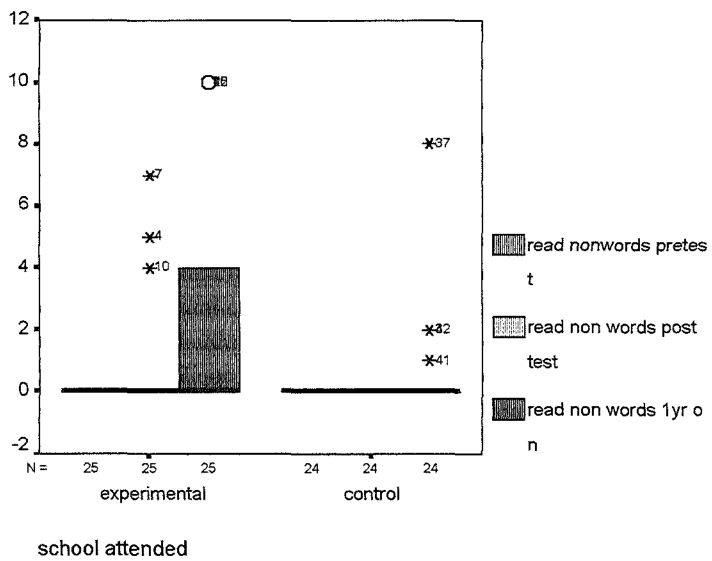
Figure 7:37. Pre, PT1 & PT2 Measures of BAS Single Word Reading.



There were seven children in the control group who were unable to read any words on the BAS reading test, only 1 of whom was able to read a word on the non-standard reading test. The pattern of reading behaviour was the same as that described for the non-standard reading test above, with the experimental children showing evidence of reading by analysis and the control children reading by sight.

Read Non-Words.

Figure 7:38. Pre, PT1 & PT2 Measures of Non-Word Reading.



Non-word reading is the most accurate test of the ability to decode words and at PT2 the experimental group was statistically significantly more able to carry out this task (mean E= 3.04, SD 4.2, mean C = .54, SD 1.69; $z=-2.405$, $p<.016$). Figure 7:38 does not show clearly that 11 experimental children could read some non-words, 6 could read them all and 5 could read between 2 and 4. Four control childrencould read some non-words, 1 could read 8 and the other 3 either 1 or 2. Several of the experimental children still faltered at the blending stage, getting as far as sounding out the letters e.g. /j/,/i/,/d/ but blending them into '*jij*. And many of the children in both groups were more interested in the 'monsters' that the non-word represented than in carrying out the task.

Read a Real Book.

The original purpose of introducing a 'real book' as a reading measure was to give the control children a chance to demonstrate their reading skill using the method followed by their school which was based on the 'real book' reading techniques proposed by Goodman (1967), Meek (1982), Smith, (1971), and Waterland (1989) outlined in chapter 2. These techniques do not rely on reading at a word analysis level but utilise the child's general experience with books, the illustrations and the anticipation, expectation and prediction of what the text is likely to say. For this purpose, a book was supplied by the 'Reading Recovery' department at the Institute of Education in London that neither of the groups could have encountered before, that had highly illustrative pictures and a simple predictable text. 'Bath Time' by Sandra Iversen, illustrated by John Parsons, reads as follows;

Page 1 Dad gets the hose.

Page 2. Mum gets the soap.

Page 3. I get the dog.

Page 4. Mum gets the brush.

Page 5. Dad gets the towel.

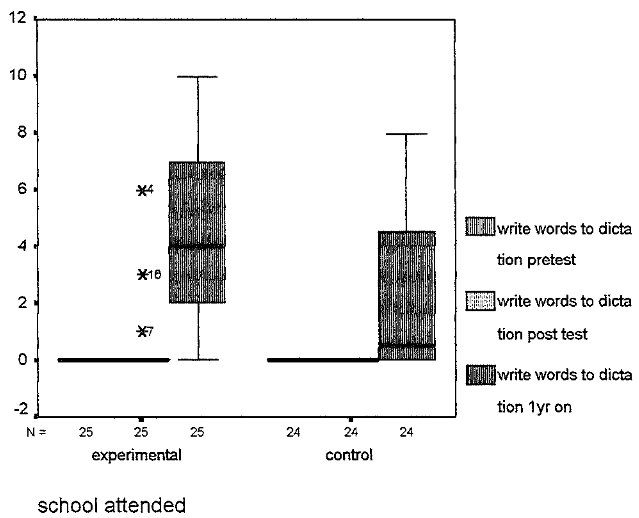
Page 6. I get wet.

The first behavioural difference that was immediately evident was that the control children were reluctant to even try and read the book. In response to the question "Do you think you can read any of this book on your own?" They generally said, "No, I can't read a book on my own yet". The book was read to them anyway, and when the reader paused to encourage them to supply a word, they would search the picture for the answer. Conversely, most of the experimental children were very relaxed about trying to read the book and used a mixture of the text and the pictures to enable them to do so. Eighteen experimental children (72%) could read at least 4 pages of the book unaided compared with 3 control children (12.5%) (chi 17.701, $p<.000$). Out of these, 11 experimental children (44%) could read the whole book unaided compared with only 2 of the control children (8%) (chi 7.991, $p<.005$). So, far from giving the control children a task in which they should have been comfortable, it transpired that reading a real book came more naturally to the experimental group.

Writing.

The experimental children's ability to write words to dictation was also significantly greater than that of the control children (mean E = 4.6, SD 3.2, mean C = 2.21, SD 2.83; $z=-2.787$, $p<.005$).

<u>**Figure 7:39**. Pre, PT1 & PT2 Measures of Writing Words to Dictation.</u>



Only 3 of the experimental children were unable to write a single word correctly at PT2. Two of these three wrote either the initial and final consonant with no vowel (the most common cause of error) or just one consonant. Twelve control children were unable to write anything correctly. For 5 of these it was the common problem of the missing vowel and the other 7 wrote a mixture of letters, some appropriate, and some idiosyncratic hieroglyphics. On the other hand 15 experimental children (60%) could write more than 4 words correctly, compared with 8 control children (33%) mainly because they were aware of the existence of the medial vowel sounds.

Summary.

In summary, the outcomes of the final measures at PT2 fall neatly into two groups, the control measures were all non-significantly different and across the complete range of experimental measures, the experimental group had a statistically significant advantage. The claim that these results are due to the 8 weeks intervention in the nursery could be challenged on the grounds that each group experienced the introduction of the literacy hour in the Reception year and the superior results of the experimental group may have been due to superior instruction throughout that year. In order to counter this possible proposition, a brief result section will follow that will compare the results presented here with the results of the additional 'in class' comparison groups; the 14 Reception children who experienced the identical Reception year instruction as the experimental children and the additional 14 Year One children, who experienced 5 hours of more advanced literacy instruction than their experimental class mates.

Chapter 8.

'In class' groups v Experimental and Control groups.

The purpose of this chapter is to demonstrate that it was not simply differentially effective teaching in the Reception Year that produced the clear cut and statistically significant advantages for the experimental over the control group. The 'in class' comparison groups, 14 reception children (R), mean age 5years, 2months and the 14 'in class' year 1 children (Y1), mean age 6years, experienced either identical or enhanced instruction to the experimental group. Therefore, any statistically significant differences between the groups in favour of the experimental group will help reinforce the claim that the intervention in the Nursery Year was causal to the experimental group's literacy achievements at PT2. Due to limited human and financial resources only 5 measures were taken as a baseline for the additional 'in class' groups, as the existence of these additional children had not been anticipated. These baseline measures, taken in the first term of the Reception year, will be compared with the experimental and control group's PT1 measures taken at the end of the Nursery year and will be referred to as PT1 measures. The baseline measures include the following:

One control measure, **Rhyme awareness**, as a measure of implicit, naturally developing phonological awareness that Bradley and Bryant (1983) proposed is crucial to reading development. Four experimental measures, **Initial phoneme identification** and **letter sound recall**, as measures of explicit phoneme awareness and gpc knowledge that were the foundation of the intervention study and which this thesis proposes should lead to successful literacy acquisition; **non-word reading**, a measure of early phonological recoding ability; **writing words to dictation** which requires segmenting and blending ability. The means and standard deviations of the groups, for the baseline measures, will be found in Table 8:G.

Table 8:G Baseline measures for 'In Class' Groups, R & Y1 and E & C.

		Last Term of Nursery		1st Term of Reception	
Baseline Measures		N 25	N 24	N 14	N 14
		E	C	R	Y1
Rhyme Detection (10/12)	Freq.	14 (56%)	5 (20.8%)	3 (21%)	7 (50%)
Initial Phoneme Identification	Mean	9.32	4.75	8.43	14.29
(t for tiger) Maximum Score 24	SD	10.29	7.74	8.93	9.96
Letter Sound Recall	Mean	10.52	1.96	3.43	8.86
Maximum Score 44	SD	10.7	3.1	3.88	7.12
Read Non-Words	Freq.	3 (12%)	0	0	1 (7%)
children who could read some n/w					
Write Regular & Irreg. Words	Freq.	4 (16%)	0	0	0
children who could write some words					

Control and 'In Class' Reception Group comparisons.

In spite of the fact that the reception group measures were taken later than the control group measures, it would be expected that as they have not received the intervention programme their profile should resemble that of the control group at (PT1). Table 8:G shows that this is in fact the case. A similar percentage of the control (C) and reception (R) children could detect rhyme (C= 20.8% and R= 21%; Chi Square=.002, df 1, ns) and Mann-Whitney tests revealed that there were also no significant differences between the control and reception groups on initial phoneme awareness or letter sound recall, and neither group scored on non-word reading or writing words to dictation. However, it should be pointed out that for letter sound recall the reception group had a 'just not significant' advantage over the control group (mean C = 1.96, SD 3.1, mean R = 3.43, SD 3.88; z=-1.895, p<.058jns) and they were also non-significantly better at initial phoneme identification (mean C = 4.75, SD 7.74, mean R = 8.43, SD 8.93; z=-1.169, ns), perhaps because they were engaged in letter sound instruction in the Reception class when they were being tested.

Experimental and 'In Class' Reception Group Comparisons.

For the limited number of measures collected from the reception group at PT1, comparisons with the experimental group followed the same pattern as the comparisons between the experimental and the control group at PT1. There was a significant difference between the experimental group and the reception group at PT1 for Rhyme awareness (freq. E = 56%, freq. R = 21%; Pearson's Chi Square = 4.362, df 1, $p<.037$) with an advantage for the experimental group. There was no significant difference between the experimental and reception groups on initial phoneme awareness (mean E = 9.32, SD 10.29, mean R = 8.43, SD 8.93; $z=-.213$, ns). However there was a significant difference for letter sound recall between the experimental group and the reception group at PT1 (mean E = 10.52, SD 10.70, mean R = 3.43, SD 3.88; $z=-2.381$, $p<.017$). For non-word reading, 3 experimental children (12%) were able to read some non-words, whereas, the reception group could read none. Neither could the reception group write any words to dictation in comparison with the experimental group, of whom 4 children (16%) could write some words.

Experimental v 'In Class' Year 1 comparisons.

There were no significant differences between the experimental children and the Year 1 children who had already experienced one year in the Reception Class but who were repeating the reception year but with a Year 1 level literacy hour. For demographic reasons the classes in Key Stage 1 had been restructured to create two reception classes. The children who were chosen to repeat the reception year were possibly less able and were the youngest of the children who moved on to the Year 1 Class. There were no significant differences for rhyme detection with 14 children (56%) in the experimental group able to detect rhyme and 7 children (50%) in Year 1 able to detect rhyme (chi-square = .130, ns). There were no differences for initial phoneme awareness (mean E = 9.32, SD 10.29, mean Y1 = 14.29, SD 9.96; z=-1.141, ns) and no differences for letter sound recall (mean E = 10.52, SD 10.70, mean Y1 = 8.86, SD 7.12; z=-.074, ns). As with other groups the children were at floor on reading non-words but 3 experimental children (12%) and 1 Y1 child (7%) could read at least one. Although 4 of the experimental children (16%) could write some words to dictation, none of the Y1 children were able to write words. After a full year of instruction in the Reception Class these 6 year olds were comparable to the 5 year olds who had an 8 week introduction to literacy in the nursery. It would be predicted therefore, that the experimental group would read and write at least as well as the Year 1 group at PT2.

Summary of the Position at the Beginning of the Reception Year.

There were no significant differences between the control group and the reception group on any of the measures. On the other hand, significant differences were found between the experimental group and the reception group, similar to those found at PT1 between the experimental and control groups. For example, there were no significant differences between these three groups on initial phoneme awareness but the experimental group was ahead of both control and reception groups on rhyme detection and letter sound recall. Some children in the experimental group were able to read a few non-words and write a few words to dictation, however, no child in the control or reception groups was able to carry out either of these tasks. Therefore, as expected, the reception and control groups are similar to each other and differ from the experimental group in similar ways.

The differences between the experimental and Year 1 groups are all non-significant.

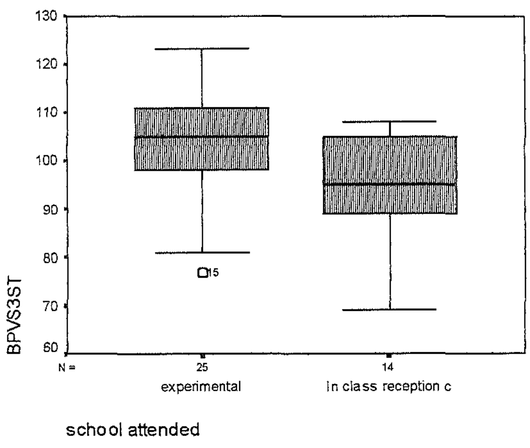
This supports the claim that the effects of the intervention are already apparent at the start of learning to read and leads to the prediction that these differences will result in an advantage in reading and writing for the experimental group over their same age classmates who will receive identical instruction throughout the Reception year. It would also be predicted there will be no significant differences between the control and reception groups at the end of the Reception year when they will both have received a daily hour of literacy instruction according to the NLS for England and Wales. A further prediction is that that the experimental group will read and write at least as well as their older classmates who will be receiving more advanced instruction. Three sets of comparisons will be made therefore: first, between the experimental and reception groups; second between control and reception groups; and third, between experimental and 'in-class' Year 1 groups. Table 8:H on the following page gives the means and standard deviations for all 4 groups at PT2.

Experimental Group v Reception Group at PT2.

A BPVS measure was taken at the end of the reception year to test for any significant differences in general verbal IQ between the experimental and reception groups.

BPVS.

Figure 8:40. PT2 Measures of Oral Language, BPVS, for Groups E and R.



There were no significant differences between the groups on this measure of IQ at PT2 (mean E = 102.44, SD 12.24, mean R = 95.29, SD 10.76; z=-1.788, ns).

Table 8:H. PT2 Measures for 'In Class' Groups, R & Y1 and E & C.

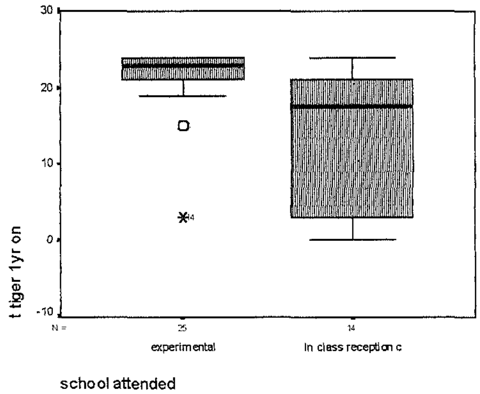
PT2 Measures		N25	N24	N 14	N14
		E	C	R	Y1
Rhyme Detection (10/12)	Freq.	n19 (76%)	n12 (50%)	n5 (35%)	n8 (57%)
Initial Phoneme Identification	Mean	21.8	17.96	13.29	18.93
(t for tiger) Maximum Score 24	SD	4.46	6.63	9.01	5.17
Letter Sound Recall	Mean	23	15.29	11.21	19.5
Maximum Score 44	SD	9.57	8.48	9.71	7.84
Print concepts	Mean	17.12	13.58	11.86	17.36
Maximum Score 24	SD	4.94	3.72	4.97	2.82
Young's Reading Test	Freq.	n22 (88%)	n11 (46%)	n6 (43%)	n6 (43%)
Frequency of reading age <6 years					
Read Words	Mean	5.52	2.29	2.14	5.93
Non-Standard 12	SD	4.28	3.68	3.28	4.62
Bas Single Word Reading	Mean	17.48	7.46	5.79	13.07
	SD	15.51	10.48	6.1	9.52
Read Non-Words	Mean	3.04	0.54	0.71	2.07
Non-Standard Maximum Score 10	SD	4.2	1.69	1.73	3.29
Reading a Real Book	Freq.	n11 (44%)	n2 (8%)	n0	n3 (21%)
Writing Words to Dictation	Mean	4.6	2.21	1	4
Maximum Score 10	SD	3.2	2.83	1.84	3.62

Rhyme Detection.

At PT2, rhyme awareness has improved for both the groups and the differences between the groups have remained statistically significant (Freq. E = 76% and R = 35%; chi square = 6.154, df1, p<.013). The experimental group has increased their early advantage but more than half the reception group are still unable to detect rhyme.

Initial Phoneme Identification.

Figure 8:41. PT2 Measures of Initial Phoneme Identification for Groups E and R.

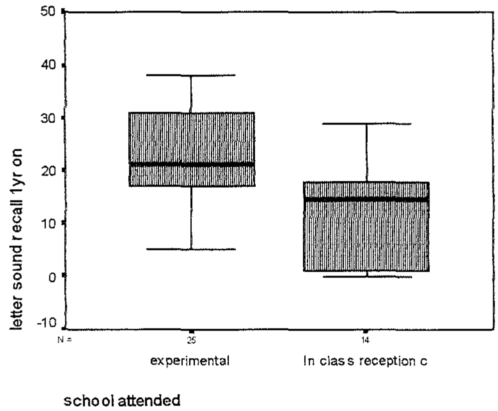


At the beginning of the Reception year there were no significant differences between the two groups on initial phoneme awareness (mean E = 9.32, SD 10.29, mean R = 8.43, SD 8.93; z=-.213, ns). However, although both groups have improved, the experimental group were significantly ahead of the reception group on this measure at the end of the Reception year (mean E = 21.80, SD 4.46, mean R = 13.29, SD 9.01; z=-3.411, p<.001). This suggests that the early introduction to phoneme awareness has enabled the experimental group as a whole to develop an increasing awareness of phonemes, which is the basic ability necessary for decoding and spelling.

Letter Sound Recall.

The experimental group was significantly ahead of the reception group at PT1 due to their early training and they increased that advantage at PT2 (mean E = 23, SD 9.57, mean R = 11.21, SD 9.71; z=3.064, p<.002). However, the qualitative behaviour of the groups was similar as the reception children were having phonics instruction through out the reception year albeit at a much slower pace than was maintained in the Nursery for the experimental group.

Figure 8:42. PT2 Measure of Letter Sound Recall for the Groups E and R.

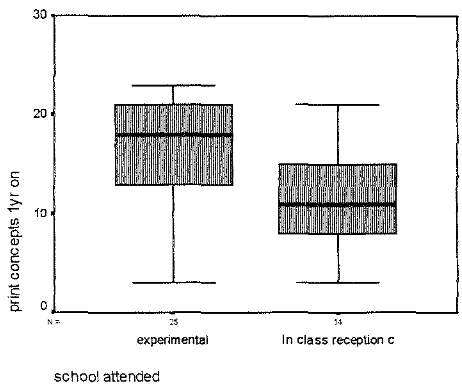


Reading.

Print Concepts.

In spite of sharing the same instruction for the Reception year, the experimental group knew more about print than the reception group and this difference was significant (mean E = 17.12, SD 4.94, mean R = 11.86, SD 4.97; $z=-2.951$, $p<.003$).

Figure 8:43.PT2 Measures of Print Concepts for Groups E and R.

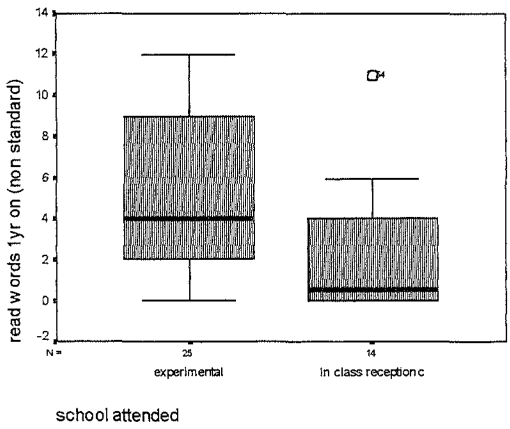


Young's Reading Test.

The frequency for a reading age of over 6 years on Young's Reading Test is 22 for the experimental group (88%), and 6 for the reception group (43%) There are significantly more experimental children who achieved a reading age of over 6 years than reception children (chi-square = 9.032, df1, $p<.003$).

Read Regular and Irregular Words.

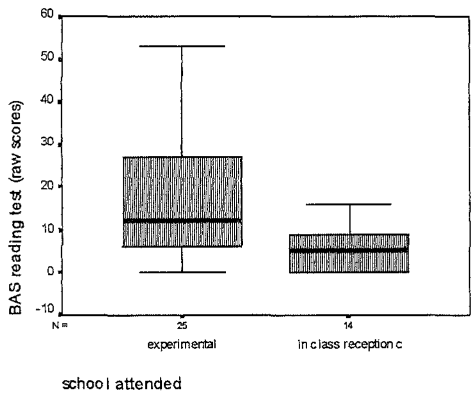
Figure 8:43a. PT2 Measures of Reading Words for Groups E and R.



There was also a significant difference for reading regular and irregular words (mean E = 5.52, SD 4.28, mean R = 2.14, SD 3.28; z=-2.796, p<.005).

BAS Single Word Reading.

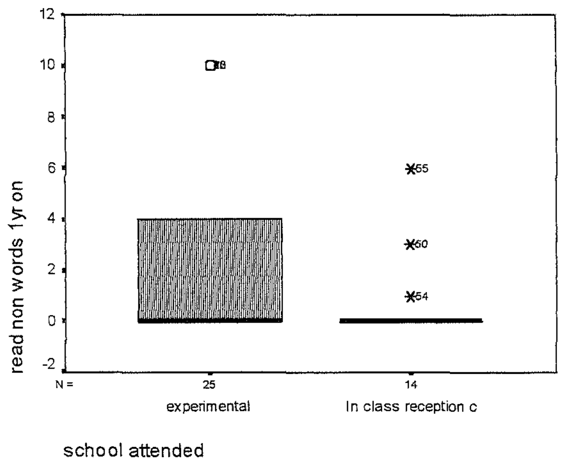
Figure 8:43b. PT2 Measure of BAS Single Word Reading for Groups E and R.



The experimental group also had a significant advantage over their peers for reading words on the BAS single word reading test (mean E = 17.48, SD 15.51, mean R = 5.79, SD 6.10; z=-2.556,p<.011).

Read Non-Words.

Figure 8:43c. PT2 Measures of Non-Word Reading for Groups E and R.



At PT1, 3 of the experimental children (12%) could read a few non-words. At PT2, however, 11 children (44%) in the experimental group and 3 children (21%) in the reception group could read some non-words. This was a taxing task for all the children; nonetheless, as can be seen only indistinctly in figure 8.43c, 6 experimental children could read all 10 of the non-words figure.

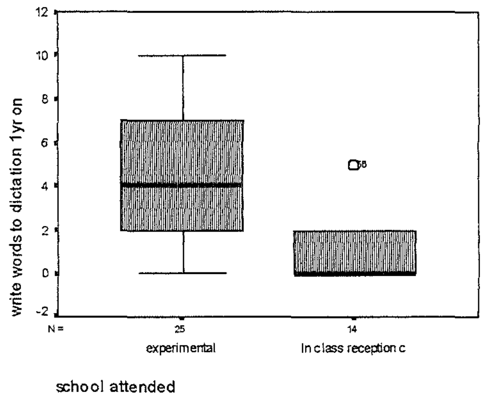
Read Real Book.

Eleven experimental children (44%) were able to read every page of a real book but none of the reception children could read every page. Eighteen children (72%) in the experimental group but only 4 children (28%) in the reception group could read at least 4 pages.

Writing Words to Dictation.

At PT1, 4 children could write some words to dictation but none of the reception children could write any. The only instruction these 4 children had to enable them to write words was during the intervention, although their ability was encouraged throughout the final term in Nursery. At PT2, only 3 experimental children (12%) could **not** write one word to dictation whereas 10 children (71%) in the reception group could not write one word.

Figure 8:44. PT2 Measure of Writing Words to Dictation for Groups E and R.



The statistical difference between the experimental and reception groups for writing words to dictation was significant (mean E = 4.60, SD 3.20, mean R = 1.00, SD 1.84; z=-3.556, p<.000). Figure 8:44 illustrates the advantage for the experimental group for this literacy skill.

Summary.

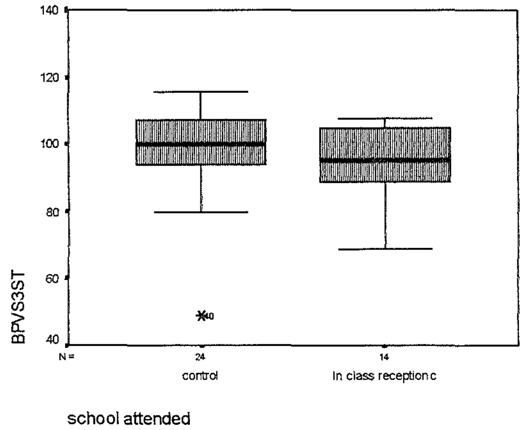
In summary, as predicted the experimental group have a statistically significant advantage on all the measures of reading and writing over their 'in class' peer group.

Control Group v Reception Group at PT2.

BPVS

The BPVS measure taken as a general measure of verbal IQ demonstrates that there is no significant difference between the control and reception groups as seen in figure 8:45.

Figure 8:45. PT2 Measure of BPVS for Groups C and R.

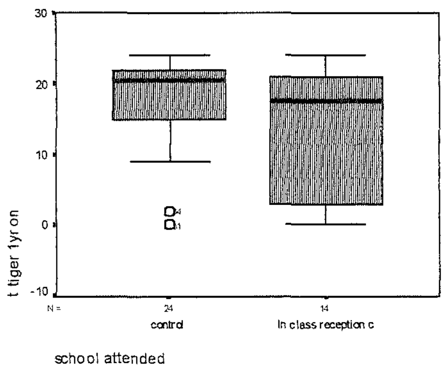


Rhyme Detection.

More children in each group could detect rhyme at PT2 than could detect rhyme at PT1. Although a greater percentage of children in the control group could now detect rhyme than in the reception group this difference was not significant (C = n12 (50%), R = n5 (35%); chi square = .730, df1, ns).

Initial Phoneme Awareness

Figure 8:46. PT2 Measures of Initial Phoneme Identification for Groups C and R.

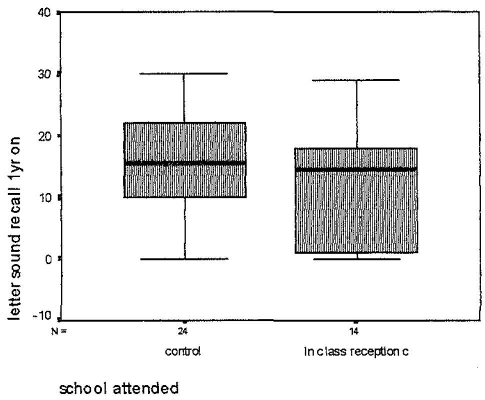


There were still no significant differences in phoneme awareness between the groups at PT2 (mean C = 17.96, SD 6.63, mean R = 13.29, SD 9.01; z=-1.610, ns). More children in the control group could identify initial phonemes than in the reception group, as can be seen by the longer tail for the reception group in Figure 8:46.

Letter sound recall

Nor were there any differences between the groups on letter sound recall although the control group have non-significantly overtaken the reception group at PT2 (C = 15.29, SD 8.48, mean R = 11.21, SD 9.71; z=-1.062, ns). Again the longer tail in the reception group demonstrates that more children are unable to recall many letter sounds.

Figure 8:47. PT2 Measure of Letter Sound Recall for the Groups C and R.

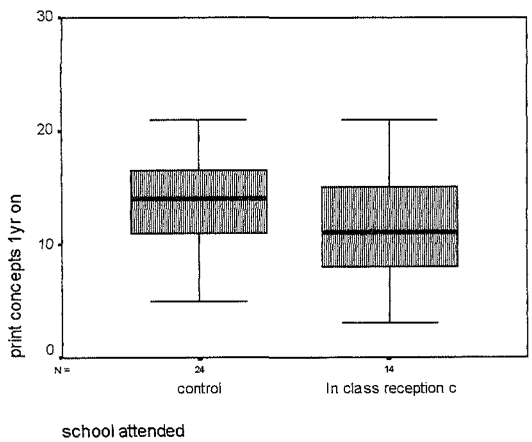


Reading

Print Concepts.

The two groups concepts about print were equivalent (mean C = 13.58, SD 3.72, mean R = 11.86, SD 4.97; z=-1.277, ns).

Figure 8:48.PT2 Measures of Print Concepts for Groups C and R.



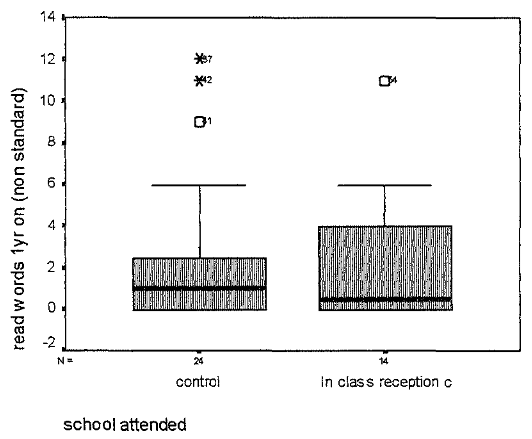
Young's Reading Test

The same percentage of children achieved a reading over 6 years on the Young's reading test at PT2, i.e. 11 control children (46%) and 6 reception children (43%) (chi-square = .032, df1, ns).

Read Words

The two groups were also equivalent on reading words (mean C = 2.29, SD 3.68, mean R = 2.14, SD 3.28; z=-.113, ns).

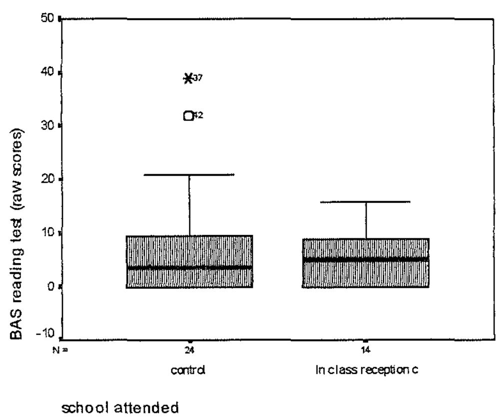
Figure 8:48a. PT2 Measures of Reading Words for Groups C and R.



BAS Single Word Reading

There were also no significant differences for BAS reading (mean C = 7.46, SD 10.48, mean R = 5.79, SD 6.1; z=-.108, ns).

Figure 8:48b. PT2 Measure of BAS Single Word Reading for Groups C and R.



Read Non-Words.

Four control children (16%) could read some non-words in comparison with 3 reception children (21%).

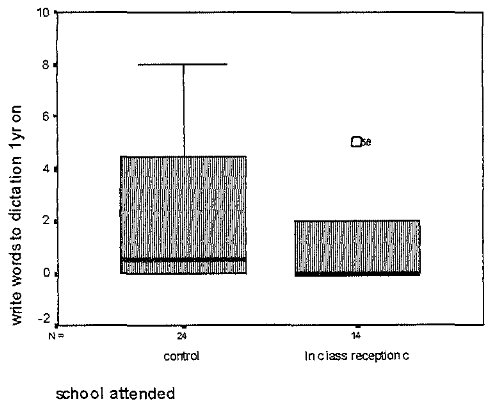
Read a Real Book.

Two children in the control group (8%) and none of the children in the reception group could read all 6 pages of the real book. However, 3 control children (12%) and 4 reception children (28%) could read at least 4 pages.

Write words to Dictation.

There were no differences for writing words to dictation at PT2 (mean C = 2.21, SD 2.83, mean R = 1, SD 1.84; z=-1.383, ns.). Half the children were at floor in both groups.

Figure 8:49. PT2 Measure of Writing Words to Dictation for Groups C and R.



Summary.

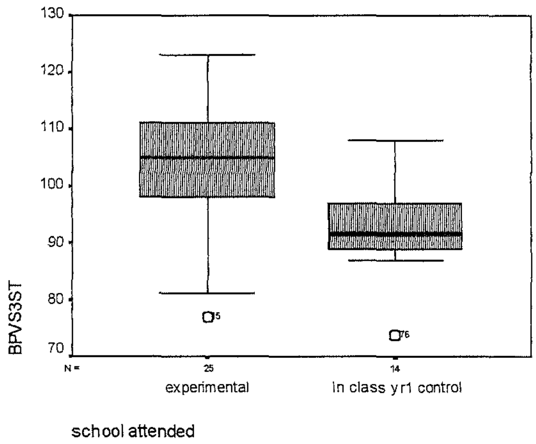
In summary, as predicted the control and reception groups have no significant differences between them on any of the reading and writing measures at PT2.

Experimental Group v 'In Class' Year 1 Group.

BPVS.

The difference in verbal IQ between these two groups is significant (mean E = 102.44, SD 12.24, mean Y1 = 92.64, SD 7.89; z=-2.521, p<.012). Therefore the following results must be viewed accordingly. Unfortunately this measure was not taken for the Year 1 group at baseline (PT1).

Figure 8:50. PT2 Measures of Oral Language, BPVS, for Groups E and Y1.

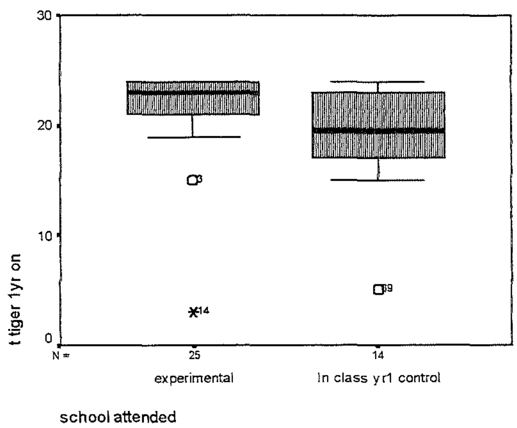


Rhyme Detection.

Nineteen experimental children (76%) and 8 Year 1 children (57%) were aware of rhyme at PT2. This difference was significant (chi-square = 1.498, df1, ns).

Initial Phoneme Identification.

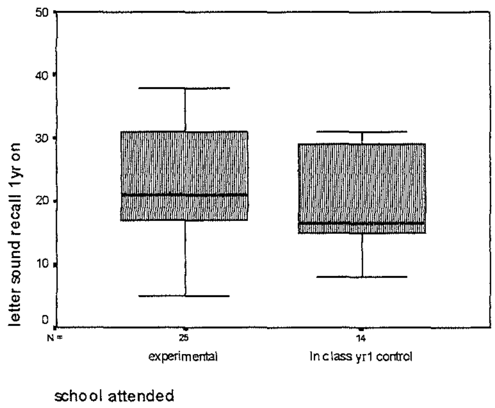
Figure 8:51. PT2 Measures of Initial Phoneme Identification for Groups E and Y1.



Although there were no differences between the groups at PT1, there is a significant difference for initial phoneme awareness at PT2 (mean E = 21.8, SD 4.46, mean Y1 = 18.93, SD 5.17; z=-2.312,p<.021). On this measure, the experimental group is therefore significantly ahead of all three comparison groups.

Letter Sound Recall.

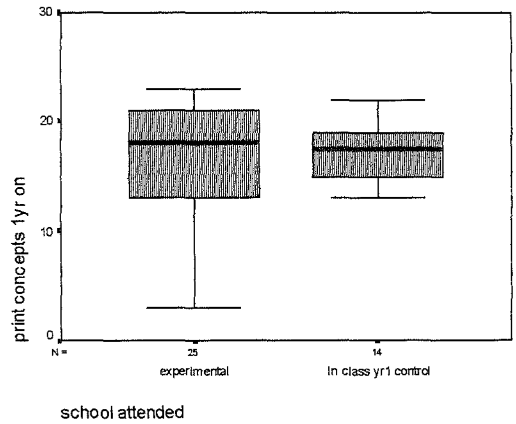
Figure 8:52. PT2 Measure of Letter Sound Recall for the Groups E and Y1.



There were no significant differences for letter sound recall at PT2 (mean E = 23, SD 9.57, mean Y1 = 19.5, SD 7.84; z=-1.218, ns).

Print Concepts.

Figure 8:53.PT2 Measures of Print Concepts for Groups E and Y1.



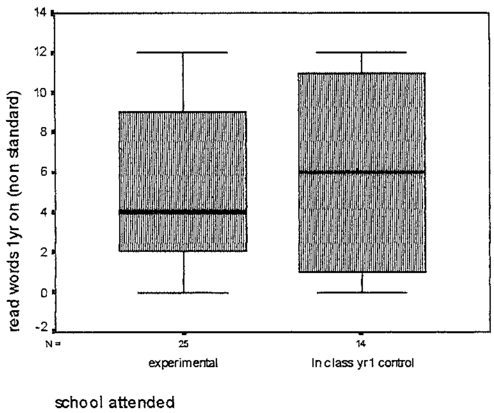
There were no significant differences for print concepts at PT2 (mean E = 17.12, SD 4.94, mean Y1 = 17.36, SD 2.82; z=-.176, ns). However, the Year 1 group were more homogeneous than the experimental group. After 2 years in Reception the whole group had a basic knowledge about print.

Young's Reading Test.

Twenty-two experimental children (88%) achieved a reading age greater than 6 years and 6 Year 1 children (43%) reached this level and this difference is statistically significant (chi-square = 9.032, df1, p<.003). For this measure the experimental group's gpc knowledge enabled them to distinguish between words that were visually similar.

Read Words.

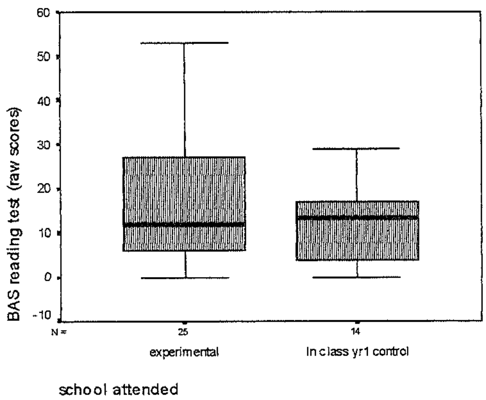
Figure 8:53a. PT2 Measures of Reading Words for Groups E and Y1.



There were no statistically significant differences between the experimental and Year 1 children on reading regular and irregular, three and four letter words (mean E = 5.52, SD 4.28, mean Y1 = 5.93, SD 4.62; z=-.177, ns).

BAS Single Word Reading.

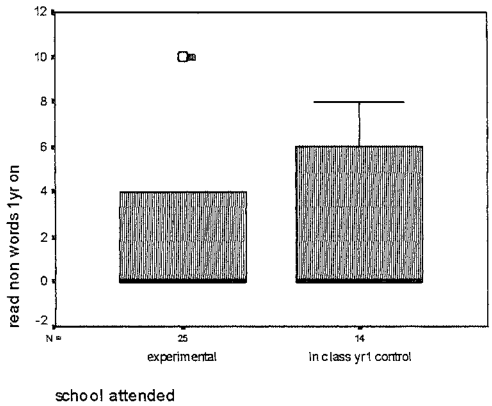
Figure 8:53b. PT2 Measure of BAS Single Word Reading for Groups E and Y1.



There were also no significant differences for the BAS measure of single word reading (mean = E 17.48, SD 15.51, mean Y1 = 13.07, SD 9.52; z=-.542, ns). It can be seen in Figure 8:53b that a few of the children in the experimental group could read a greater number of words. This was achieved by utilising their gpc knowledge and blending ability to sound out and pronounce the word accurately.

Read Non-Words.

Figure 8:53c. PT2 Measures of Non-Word Reading for Groups E and Y1.



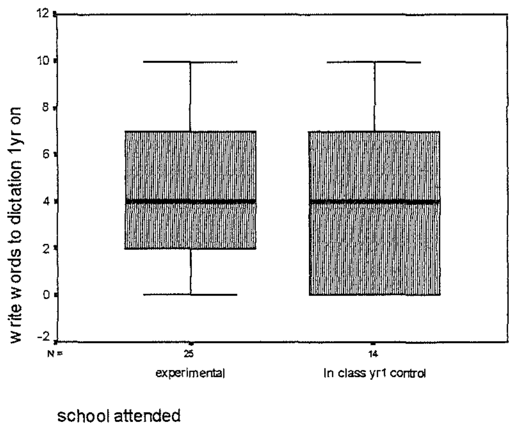
Eleven experimental children (44%) could read some non-words, (with 5 experimental children (20%) reading between 2-4 and a further 6 children (24%) reading all 10) compared with 5 Year 1 children (35%) who could read between 1-8 non-words. The difference between the groups was not significant (mean E = 3.04, SD 4.2, mean Y1 = 2.07, SD 3.29; z=-.724, ns).

Read a Real Book.

Of the experimental group, 11 children (44%) could read every page unaided but only 3 Year 1 children (21%) could read every page (chi-square = 1.987, df1, ns). However, 18 experimental children (72%) could read at least 4 pages and so could 7 Year 1 children (50%).

Write words to Dictation.

Figure 8:54. PT2 Measure of Writing Words to Dictation for Groups E and Y1.



Of the experimental group 22children (88%) could write at least one word to dictation compared with 10 Year 1 children (71%); the difference was not significant but fewer of the experimental group were at floor (mean E = 4.6, SD 3.2, mean Y1 = 4, SD 3.62; z=-.618, ns).

Summary.

In summary, the measure of verbal IQ at PT2 shows a significant advantage for the experimental group but unfortunately, the baseline data for the 'in-class' comparison groups on this measure was not taken. It therefore cannot be known if the two groups were significantly different at the start of the reception year or whether they were well matched at that point. This argument assumes that the experimental group's IQ has significantly improved since the reception year. This assumption was investigated with a t-test, which showed that there had indeed been a significant improvement in IQ standard scores for the experimental group (mean BPVS standard score, nursery pre-intervention = 89.6, SD 7.7; mean BPVS standard score, end of Reception = 103.1, SD 12.1; t (24 df) = 8.24, p < .000). Such a large and significant improvement in standard scores is unusual, as standard scores are adjusted for developmental change, and therefore this represents a real increase in verbal IQ, as measured by the BPVS.

On two of the measures the experimental and Year 1 groups were equivalent, i.e. print concepts and the non-standard reading words tests. However, the experimental group were better on all the other reading and writing measures than the Year 1 group but only 2 of these measures, initial phoneme identification and the Young's reading test, were statistically significantly better.

Conclusion.

As mentioned previously the experimental group and their classmates were subjected to several changes in teaching staff. It was only in the last term of the Reception class that 2 good permanent members of staff were found for the 2 reception classes. The results presented in this chapter seem to bear out the claim that the early intensive introduction to literacy skills inoculated the experimental children against the disrupted classroom regime and variety of teaching styles they encountered in the Reception Year. Their accelerated literacy ability enabled them to gain the maximum benefit from the formal instruction they received. The two measures that significantly differentiate the experimental group from all 3 comparison groups are phoneme awareness and gpc knowledge as evidenced by the experimental group's advantage for initial phoneme identification and the ability to distinguish between words in Young's Reading Test. These two measures, together with blending and segmentation skills, also gave them an advantage for reading and writing over the cohort control and reception groups. The only means these children had of acquiring the skills they brought with them to the Reception year was through the intervention study and the results above support the claim that the intervention was causal to the advantage they gained by the end of the Reception Year.

Chapter 9.

Summary and Conclusions.

Summary of the Results.

This thesis answers the call for 'real' classroom research into the role of phonological awareness in literacy acquisition (Howe & Eisenhart, 1990; Snow, 1974; Troia, 1999). Although in the late 1990's there have been a number of literacy intervention studies in schools on a whole class basis (see chapter 3), this is possibly the only longitudinal training study that has intervened at a whole class level in kindergarten. Also, this study is unique in the fact that it has monitored the differences in outcomes after the first year of the NLS in Reception, between a 'whole language' kindergarten class of 24 children and a class of 25 children who have been introduced to the alphabetic principle. The results have demonstrated a statistically significant advantage for the intervention 'alphabetic principle' group on all 14 experimental measures, whilst the two groups were no different on any of the 11 control measures. Further, the intervention group were divided into two groups on arrival into Reception and each group was joined by 7 reception age children and 7 Year 1 age children (14 reception and 14 Year 1 in total) that acted as 'in class' comparison groups. Results showed that the intervention group was significantly better on all the measures of reading and writing tested than their 'in class' peer, reception group in spite of the fact that the 'in class' reception group received identical literacy instruction in the Reception Class to the intervention group. The 'in class' reception group and the control group had no significant differences between them on any of the reading and writing measures given. The intervention group was also better on all the measures than the Year 1 group (who had been in reception for a year and were currently receiving a Year 1 level, literacy hour), but only 2 of these measures were statistically significantly different, initial phoneme identification and the Young's reading test. These results support the claim that the superior phoneme awareness and gpc knowledge demonstrated by the intervention group, that distinguished them from the other three groups, were causal to their advantage in literacy skill over both groups of same age peers, the control and 'in class' reception groups. Although the intervention group were not statistically significantly better on all the measures than the 6-year-old, Year 1 group, they were more than equal putting them a year ahead of their peers.

Qualitative Differences.

(Statistically Significant at PT1).

At the end of the Nursery year (PT1), the intervention group was significantly ahead of the control group on the measures of phoneme awareness such as **phoneme segmentation, letter-sound recall, writing sounds and words to dictation**. Apart from being ahead at this stage, the behaviour of the intervention children was qualitatively different from the control group in that they clearly demonstrated understanding of the tasks even if they failed to perform them accurately. They were also significantly ahead and more confident in their knowledge about **print concepts** such as, where to start reading text and the direction of the text etc.. This knowledge had been gained through observation and verbalisation of the writing process. Although both groups improved on these measures as would be expected by the end of the Reception year (PT2), the intervention group retained their significant advantage. The measures of reading, i.e. **single word reading, the Young's reading test** and **reading regular, irregular** and **non-words**, were mostly beyond both groups at the end of the Nursery year (PT1). However, again there were qualitative differences between the groups in that the intervention children's incorrect responses reflected an understanding of the alphabetic principle of reading but stumbled over the blending at this stage, whereas the control children simply had no skills to tackle decoding or the discrimination between words. By the end of the Reception year (PT2), however, the intervention children were significantly ahead of the control group on all the reading tasks as their gpc knowledge and blending and segmenting skill enabled them to decode and distinguish between words. Twenty-two children (88%) in the intervention group achieved a reading age of over 6 years on the Young's reading test, compared with 11 children (46%) in the control group and 43% of both 'in class' comparison groups, giving them a statistically significant advantage over all three groups. The Young's reading test is a word-choice test in which the experimental group's segmenting and gpc knowledge enabled them to choose the correct alternative. This demonstrates that the majority of the intervention group had acquired the fundamental concept of the alphabetic principle even if some of the children were, as yet, unable to read aloud many single words or non-words. The high proportion of the experimental children achieving a reading age of 6 also indicates that even the children with low IQ's and the EAL children, as well as the least advantaged children, had all benefited from the intervention.

(Non-Significant Differences at PT1)

There were no significant differences at the end of the Nursery year (PT1), either in **letter-sound recognition** or **initial phoneme identification** between the intervention and control groups. However, there were marked qualitative differences in **letter-sound recognition** as children in the intervention group responded to the sound of the phoneme by pointing to the printed letter without hesitation, often repeating the sound as they did so. On the other hand, the control children who scored on this task, usually asked in response to, e.g. /f/, ' is that an 'F'?' deriving the sound from the name of the letter. Hence, the significant difference on the letter-sound *recall* task, in which the intervention children would give a phoneme in response to the printed letter but the control children usually responded with the name.

Although the intervention group's mean score for **initial phoneme identification** was twice that of the control group's, this was not sufficient to be statistically significant at the end of Nursery year (PT1). The initial phoneme is usually the first phoneme that children become aware of and are able to isolate in a word, and its isolation therefore marks an important stage in literacy development. The qualitative difference here was that the intervention children's errors were often over-extension of the initial phoneme (e.g. /va/ for vase), whereas the control children often repeated the whole word or on occasion gave the initial letter name. By the end of the Reception year, however, the intervention group had a statistically significant advantage on this measure over all three of the comparison groups, with only 3 intervention children scoring less than 20 out of a possible 24. This demonstrated that the intervention group's phoneme awareness had been enhanced through the introduction to gpc's in the Nursery, as the rehearsal of the blending and segmenting of phonemes was made concrete through the link with their visual symbols.

Implications for 'Whole Language'.

Frustrated by the gullibility of the educational establishment in accepting Ken Goodman and Frank Smith's 'whole language' theory wholesale, Denis Stott (1981), declared that *"When a theory is so massively wrong one is faced with a problem - like that of the legendary slayer of monsters - as to which of many heads to cut off first."* The results of this study support Stott's proposition that literacy acquisition "is a matter of guiding the child's 'self-induction' of the phonic correspondences". This proposition is also supported by psychological theory that reasons that "Reading is appended parasitically onto an already existing system. Because orthography represents the spoken language it maps systematically onto phonology rather than meaning. Written language must be phonologically recoded in the mental lexicon for meaning to be accessed" (Frost, 1998; see also Mattingly, 1972 and Share, 1995). It is therefore suggested that the early introduction to the alphabetic principle helps forge these cognitive links. Hopefully the 'whole language' *head* that claims that 'the alphabetic principle is a handicap to literacy acquisition' is vanquished for good.

Rhyme Awareness.

It has been claimed that pre-schooler's phonological awareness, found to be strongly related to their eventual success in reading, (Bradley and Bryant, 1983; Lundberg, Olofsson, and Wall, 1980) originates from early experiences with nursery rhymes, songs and rhyming games (Bradley and Bryant, 1983; Maclean, Bryant and Bradley, 1987). It was proposed (Maclean et al, 1987) that by increasing the amount of experience that 3-year-old children have with nursery rhymes, there would be a corresponding improvement in their awareness of sounds and hence a greater success in learning to read, a strategy that is included in the NLS. However, the progress of rhyme awareness observed during this study casts doubt on this interpretation of the evidence.

At baseline, only one child in each group could detect rhyme, when the mean score for letter sound knowledge for both groups was less than 1. However, at the end of the Nursery year (PT1), after the intervention group had been introduced to gpc's (mean letter-sound recall =10.52), 14 (56%) of them were able to detect rhyme compared with only 5 (21%) of the control children (mean letter-sound recall =1.96), whose teacher had focused on rhyme. By the end of the Reception year (PT2), when the control children's letter-sound knowledge had developed (mean letter-sound recall =15.29) there was no significant difference in rhyme awareness between the groups. This would seem to suggest that it was the induction of letter sound knowledge that caused the early enhancement of rhyme awareness at the end of the Nursery year (PT1) for the intervention group, not the reverse. Previous links that have been found between rhyme awareness and literacy may possibly have reflected an undetected, underlying phoneme awareness. This undermines Goswami and Bryant's (1990) claim for the special status of onset and rime units in literacy acquisition, which is predicated on the evidence of a link between rhyme awareness and literacy. Goswami proposed a connection between her finding that beginning readers were able to make analogies between the ends of words, whose spelling patterns involved rhyme and the evidence that rhyming skill predicted later reading ability.

Developmental v Instructional Theory.

Goswami (1990a; 1991; 1992; 1993; 1996; 1999) posited an influential *developmental* theory of literacy acquisition in which she proposed that awareness of linguistic units known as the 'intra-syllabic phonological units' of onset and rime, emerges prior to beginning to learn to read. It is proposed that children can then capitalise on this awareness in the initial stages of literacy acquisition by using a process of analogy. Goswami (1993) suggests that "soon children will realise the need to analyse the relationship between spelling patterns and smaller units of sound represented by phonemes". As with the 'whole language' philosophy discussed in chapter 2, this may be too sanguine a view, not only of children's abilities but also of their motivation.

This study has adopted an *instructional* position and has shown that the concept of the alphabetic principle can easily and enjoyably be induced in children as young as three and a half years old, i.e. the principle that written words can be segmented into graphemes, translated into phonemes and recombined to blend into spoken words. The induction of this vital concept can bring children, as Vygotsky proposed, to 'their zone of proximal development'. They can start school equal to more fortunate children who bring this advantage from home, an advantage that Stuart and Masterson (1992) have shown predicts reading skill at 10-years-old. This simple, 8-week programme, that is equally as enjoyable for the teacher as for the children, dispenses with the need for a 'hit and miss' developmental strategy to bring this vital concept to children.

Outside the Restraints of Experimental Research.

At the beginning of the this study it had been expected that the results would lead to a claim that the intervention children would be ideally placed to start formal literacy training as they would be more phonemically aware than the control children. However, the extent to which the initial induction into the alphabetic principle boosted the children's literacy acquisition was quite unexpected given the children's less advantaged backgrounds and very young age. Also, the eagerness and enthusiasm that greeted each session was a surprise, facilitating the whole class activity with very little disruption. It has to be admitted however, that the experimenter is not a teacher and when on the last day of the intervention, the newly arrived class teacher joined in the session her control and expertise was immediately apparent. Therefore, it could be expected that the programme would produce even better results with an experienced teacher. This particular teacher was so impressed with the children's abilities that she has continued the programme but to a limited extent. She decided not to introduce the digraphs, which seems a shame as it is due more to the limitation of the teacher's expectations than the children's ability. Nursery offers a unique opportunity to introduce children to all the grapheme-phoneme correspondences in their language and the children accept the digraphs in the same way as the single letters. A full set of gpc's gives them a full tool-kit to construct and deconstruct words before they start reading and need to take account of other morphemic units. However, a positive feature that was not possible to include in this study was the teacher's intention to reinforce the phoneme introduced in the morning throughout the day in various activities, which should further enhance the children's understanding of the alphabetic principle. This would be strongly recommended for any 'real life' replication of this approach. In this study, the writing practice had to be rushed at the end of the session, when the children had really reached the end of their concentration span. It would have been ideal to have small groups practise letter shapes later in the day instead. Introducing the 44 gpc's would be even easier with little rehearsals and reminders throughout the day and the children would be more likely to remember the digraphs than they did in this study.

An important additional advantage for this approach is that on arrival in the Reception class it will be immediately apparent which children will need extra support for literacy acquisition and which children are able to move forward with a higher level of instruction. Instead of remedial literacy later the slower children could have a greater input from the very beginning.

Critical Appraisal of the Research Procedure.

In an ideal world both Nursery classes should have had equivalent input from the same experimenter. However, this is not conducive to the nature of the 'whole-language' approach. The whole language ethos is at its best when delivered by a committed and experienced teacher as it was in this study. Internal validity would also have been stronger if an independent tester rather than the experimenter had collected all the data. However, resources did not permit this but the range and diversity of the tests mitigates against the possibility of bias on behalf of the experimenter and several of the tests are in the children's own handwriting. Another potential problem for internal validity was the fact that the experimenter had carried out the intervention with one group of children who could therefore be more familiar and comfortable with her during the data collection than the control group. This problem was overcome however, as the experimenter called regularly at the control school and took an interest in the children's work. Also, every child was tested on at least 13 occasions for approximately 15 minutes and therefore became very friendly and familiar with the experimenter regardless of which group they were in. It would also be ideal to return to schools and ascertain whether the intervention children's advantage still holds. Unfortunately, life after Ph.D. beckons and any further research will have to be put on hold. It has been robustly found however, that children who arrive in school with the alphabetic principle retain an advantage for literacy at least until 10-years-old (Stuart, 1995; 2000; Stuart and Masterson, 1992).

Future Research.

If this approach could gain main stream acceptance, research would be needed to look at the morphemic units that are the most useful for children to expand their gpc knowledge and induce an understanding of the irregularities of English orthography. Secondly, as this thesis has adopted an historical perspective, it has provoked the question of whether, by explaining the etymology of words and their historical shifts to second and third year pupils, spelling ability would be enhanced. The more information children have about the construction of written language, especially English, the more it could help structure the mental lexicon.

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Appendix 1.

The Hornbook consisted of a thin board of wood, usually oak, about nine inches long and five or six inches wide, bearing a sheet on which were printed the alphabet and sometimes nine digits, and the Lord's Prayer. It had a handle, and was covered in front by a transparent layer of horn to prevent it from becoming dirty; the board and the sheet of horn were then held together by a thin brass frame. One of the few to have survived four centuries of children's handling, reveals the most generally accepted approach to literacy acquisition since its inception. At the top the full alphabet is printed in lowercase letters, followed by a set of five vowels with diacritical marks above them indicating the long vowel sounds. Next is the alphabet in uppercase letters. Below this, the page is divided in half, vertically, and on the left the vowels are repeated on the first line, followed by /ab/, /eb/, /ib/, /ob/, /ub/ on the second, /ac/, /ec/, /ic/, /oc/, /uc/ on the third and /ad/, /ed/, /id/, /od/, /ud/ on the fourth. The right hand side of the page mirrors the left except that the vowel comes after the consonant e.g. /ba/, /be/, /bi/, /bo/, /bu/ etc.. Beneath come the words that accompany the 'sign of the cross', 'In the name of the Father, and of the Son and of the Holy Ghost. Amen.' And finally, 'The Lord's Prayer'. The Hornbook is thought to be an English invention although the Dutch had what they called an 'a b boordje' which was just an abecedarium without the religious text and similar boards known as 'prayer boards' were used in Nigeria, in the 18^{th} Century to teach the Koran (Manguel, 1997).

Appendix 2.

Flesch's (1955) classification of the grapheme-phoneme correspondences in English.

Twenty-five of the 44 sounds are consonants

Eighteen of which come in pairs, 'soft' and 'hard'.

/b/ and /p/ as in *bib* and *pup.*
/d/ and /t/ as in *dad* and *toot.*
/g/ and /k/ as in *gag* and *kick.*
/v/ and /f/ as in *valve* and *fluff.*
/z/ and /s/ as in *zig-zag* and *sis.*
/th/ (soft) and /th/ (hard) as in *thistle* and *thither.*
/w/ and /wh/ as in *wayward* and *whistle.*
/j/ and /ch/ as in *jam* and *choo-choo train.*
/zh/ and /sh/ as in *treasure* and *trash.* (/zh/ has no symbol, it is represented by /s/ e.g. television, casual, measure, usual).

Then there are six consonants often called semivowels.

/l/ as in *lull.*
/m/ as in *ma'm.*
/n/ as in *nun.*
/r/ as in *rare.*
/y/ as in *yo-yo.*
/ng/ as in *singing.*

The twenty-fifth consonant is;

/h/ as in *his* or *hers.* (Two superfluous consonants that can also represent consonant combinations, are /q/ and /x/).

Thus, 21 letters have been used to write 25 consonants, leaving 5 letters to write 19 vowels sounds.

Nineteen of the sounds are vowels.

Five short vowels and five long vowel sounds		**+Alternative spellings for long vowels**
/a/ short as in *bag,*	long as in mate (with a silent 'e')	/ai/ and /ay/
/e/ short as in *beg*	long as in mete.	/ee/ and /ea/
/i/ short as in *big;*	long as in mite.	/ie/, /y/ and /ye/
/o/ short as in *bog,*	long as in mote.	/oa/, /oe/ and /ow/
/u/ short as in *bug;*	long as in mute.	/ue/ and /ew/

Three diphthongs with two different spellings.

/au/ as in *Paul* and *crawl.*
/ou/ as in *spouse* and *cow.*
/oi/ as in *noise* and *boy.*

The final six.

/oo/ short as in *whoosh, push* and long as in *Rube, boob.*
/ah/ as in *Pa. Ma, bar, car.*
/air/ as in *fair, heirs, dare, swear.*
/er/ as in *girls prefer fur.*
+ the all purpose muttering vowel, /a/ in *drama,* /e/ in *item,* /i/ in *devil,* /o/ in *button,* /u/ in *circus.*

Appendix 3

39 Phoneme Awareness Stories that describe the Jolly Phonics Alphabetic Frieze

Plus corresponding phoneme awareness words and visual encoding words that only include the current phoneme and previously encountered phonemes.

Story 1. Sid the Snake.

If you listen carefully you can hear the sound /s/ at the beginning of 'snake' and I'm going to tell you about a snake called Sid. Sid's name starts with a /s/ sound as well.... Ssss/id. Can you hear the /sssss/? His real name is Sidney but everyone calls him Sid. When Sid is scared or frightened he makes himself into a shape like this, (make back to front S shape with left hand, i.e. start left to right) like an 'S' and he makes a sound like this /sss/.

Sid lives in a wood and on sunny days he slithers and slides to the edge of the wood to sleep in the sun-shine. One day when Sid was snoozing in the sun he opened one eye and saw a spider spinning a web and he was scared. He made himself into a shape like this....S... and he make a sound like this /sss/. WHAT SOUND DID HE MAKE? /SSS/. Why do you think he was scared? Are you scared of spiders?

Perhaps it's because spiders can run very fast on eight legs and Sid thought it might run down his back. But do you know what happened? When the spider saw Sid, **she** was scared and she scuttled off into the grass. Sid stretched out again, enjoying the warm sun on his body when out of the corner of his eye he saw a snail. Do you think he was frightened of the snail? DO YOU THINK HE WENT /SSS/? No, he wasn't, because snails move very slowly and they are not a bit scary, are they? Well, when the snail saw Sid he thought, "Oh no, there's a big snake and it might swallow me up", so he hid his head back inside his shell. Sid rolled over and let the sun shine on his tummy, wondering why everyone was scared of him when all he wanted to do was sleep in the sun. DO YOU THINK SID WOULD BE SCARED IF HE SAW YOU? DO YOU THINK HE WOULD GO /SSSSS/.

Phoneme awareness for /s/. Sid snake sun slide sleep snooze sandpit spider spinning scared snail scary swallow sandwich salt soap sit spit spin sip sat sad sick skin slipping stop Samantha Sam Sakeel Stan Simon Salema Samuel Sandra Susan Sally Sarah.

Story 2. Ali the Ant.

Ali the ant and his army of ants tramped out of the wood in a long line searching for food to take back to their nest for Queen Alima. Soon, Ali and his army arrived at the garden where he saw Alison and Adam and their Mum and Dad sitting around a cloth on the grass, having a picnic and eating delicious food. So Ali immediately instructed his army of ants to collect as much food as they could carry. Ali was a little bit scared of children because sometimes they can step on ants and squash them but anyway he bravely advanced towards the jam pot leading his army right across Alison's skirt and onto her arm. Well, Alison didn't like the tickly feeling of ants on her arm so she brushed them off saying, "/a/ /a/ /a/" get away ants". WHAT DO YOU THINK YOU WOULD DO IF ANTS GOT ON YOUR ARM? WOULD YOU SAY "/a/ /a/ /a/ GET AWAY ANTS? Well, the thing is, Alison had some jam on her arm, so even though she brushed her arm and said, "/a/ /a/ /a/", Ali and the other ants didn't get off. Adam, Alison's little brother, just laughed because the ants weren't trying to eat his apple and he thought it was funny watching them crawl up his sister's arm. You can imagine, Alison was getting a bit upset with all these tickly ants on her arm. So her dad said, "I've got an idea, if we put lots of jam on a bun and put it on the ground, perhaps the ants on Alison's arm will go and eat that instead. So, that's what they did and sure enough, Ali ran down off Alison's arm onto the jam bun and all his army followed him. When they got as much as they could carry in their two front legs, they marched back into the wood holding it up in the air to keep it safe and clean for Queen Alima. Alison brushed her arm going "/a/ /a/ /a/" at thought of all those ants tickling her arm. HOW DID SHE GO? /a/ /a/ /a/.

Phoneme awareness for /a/.

Ali ant alima as and Alison Adam away arm am apple arrow antlers ambulance alligator acrobat accident alphabet angry asleep ankle animal afraid alarm adventure America Angela Andrew Anne Alan Alec Albert.

Visual Encoding Words for /a/ (plus /s/).

a as

Story 3. Tipi and Tom Play Tennis.

Tipi and Tom came round to play with Alison and her brother. Tipi and Tom were practising playing tennis and as the ball hit the tennis racket it made a noise like this /t/ /t/ /t/ /t/. Tipi called out, "Hey, Alison, come and play with us. You can get the ball when we miss it with our racquets". Just at that moment Tipi ran to hit the ball and accidentally kicked Alison's teddy which was lying on the ground. "Quick", said Alison to Adam, " we must pick up our toys. I'll get my Ted and you get your spinning top because Tom has got bare feet and he may hurt his toes if he kicks them". They picked up Ted and the top and put them into the tent out of the way. Then they sat down on the grass outside the tent. They watched as Tipi hit the ball and they heard it go /t/ on her racket and when Tom hit it back they heard it go /t/ on his racquet. Backwards and forwards went the ball /t/ /t/ /t/ /t/ until Tipi missed it and it bounced over to the tent. WHAT SOUND DID THE BALL MAKE ON THE RACQUET? /t/ /t/ /t/ /t/. Tipi called out to Alison, "Do you want to have a go at playing tennis with Tom, Alison?" So Alison had a go and every time she hit the ball it went (pause for response, /t/ /t/ /t/ /t/). LET'S ALL DO IT TOGETHER PRETENDING WE ARE WATCHING THEM HIT THE BALL, /a/ /a/ /a/ /a/.

Phoneme awareness for /t/.

Tipi Tom tennis toys teddy top tent tic-toc time tin tap tip ten toes teeth tongue tiger tomatoes table two television tomorrow today tortoise tambourine tree Tayo Tony Tara Tamsin Thomas Tom Tim Trudy.

Visual encoding words for /t/ (plus /s/ /a/).

at sat

Story 4. Inky.

Ian had been invited to a birthday party at 4 o'clock and it was nearly that time already. His mother called to him to go and get changed out of his slippers and put his new trainers on. He was just going to ask his Mum where his trainers were when he heard a crash and a squeaky noise that went like this, /i/ /i/ /i/ /i/. "What on earth was that crash?" his mother called from the other room, "did you knock something over Ian?" "It wasn't me" Ian called back, "I think my new pet has escaped from it's cage because I can hear him going, /i/ /i/ /i/ /i/. Ian rushed to have a look and sure enough, the little white mouse, who hated being locked up in a cage, had escaped and was running round the room. Just as Ian got to the door, the white mouse knocked over a pot of indigo ink that Ian had left on his desk, /i/ /i/ /i/ /i/, he squeaked. HOW DID HE GO? /i/ /i/ /i/ /i/.

Ian ran across the room and caught him before he could make black paw marks all over the room. The little animal was looking quite ill and sorry for himself as he sat on the top of a pile of books in a pool of indigo ink. Being outside his cage wasn't quite as interesting as he had imagined. "Now, I know what I shall call you", Ian laughed, because he had been trying to think of a name for his new pet. " I shall call you Inky". /i / /i/ /i/ /i/, squeaked Inky as he snuggled into Ian's hands making them all black and inky as well. Ian's mum came in with a big wet cloth to clean up the mess, she said "Ian go and wash your inky hands immediately and wash your little inky pet as well". "That's what I'm going to call him, Mum", said Ian, "Inky". /i/ /i/ /i/ /i/, said Inky as if he agreed. And, do you know, later when Inky was all washed and clean, he didn't mind a bit being put inside his cage while Ian went to the party. "It's much safer in here", Inky thought, "you don't get /i/ /i/ /i/ink all over you". WHAT DID INKY SAY?

Phoneme awareness for /i/.

Ian Inky invited indigo ink in it is ill interesting imagine imp injured immediately ignore if improve invent invisible insect injection Italy India index insist invalid infant

Visual encoding words for /i/ (plus /s/ /a/ /t/).

is it sit

Story 5. The Pink Party Pig.

When you make the sound /p/, you take a deep breath, then you put you lips together and you blow the air out through your lips like this, /p/. It's a bit like blowing a candle out isn't it? /p/ /p/ /p/. That's what Patrick had to do at his party, he had to blow out five candles. /p/ /p/ /p/ /p/ /p/.

Patrick was five years old today. He felt very grown up when he woke up in the morning. When he opened his eyes he saw a big parcel wrapped up in special wrapping paper, beside his bed. Patrick pulled off the paper and opened the box to find his present was a model farmyard. He was so pleased because he wanted to be a farmer when he grew up and keep lots of animals. Pigs were his favourite but he wanted to have cows and goats as well. "Wow", said Patrick ", this is the best present I've ever had". He couldn't wait for the afternoon when his friends were going to come for his birthday party. They could all play with the farmyard after the party tea. At 4 o'clock all the children arrived for the party and they all had a super time playing with Patrick's farmyard. They ate lots of popcorn and played with balloons that went pop when they burst. And, guess what, Patrick's Mum made a birthday cake in the shape of a big pink pig. On the top were 5 candles and Patrick had to blow them out. Let's all pretend we're blowing out Patrick's candles ..... /p/ 1, /p/ 2, /p/ 3, /p/ 4, /p/5.

Phoneme awareness for /p/.

Patrick parcel paper pulled pig plant proper pigsty party plane Peter playing popcorn Pat pop pink please pie parrot puff pot pan pet pen pencil pin Penny Paul.

Visual encoding words for /p/ (plus /s/ /a/ /t/ /i/).

pat tap sip tip pip spit pit

Story 6. N n n n n n noisy.

Neil's Uncle Nick had a model plane and he brought it to Neil's house. Sometimes the engine wouldn't start and sometimes it started but then stopped again. That's what was happening now, as Uncle Nick kept trying to start it, he turned the propeller and the engine went /n/n/n/n/n/n/n/n/n/ stop. /n/n/n/n/n/n/n/n/n/ stop. Then all of a sudden it went /n/n/n/n/n/n/n/n/n/ and Uncle Nick launched it into the air and it went round and round and then nose-dived into the flower beds. "Oh no", Shouted Nancy, who was Neil's friend "don't let that noisy plane smash up the nice flowers". Uncle Nick started up the little engine again (HOW DID IT GO?) and he launched the plane into the air. Off it went round and round with Uncle Nick pressing the buttons on the control box making it turn this way and that way. Suddenly, the plane took off across the park at the end of the garden. Uncle Nick was pressing the buttons on his control box but they weren't working. Neil and Nancy climbed over the fence and ran after the plane, /n/n/n/n/n/n/n/n/n/ it went as it flew across the park. "Oh no!" they cried, as it started to nose-dive towards the lake. "I know" shouted Nancy, "I'll try and catch it with the fisherman's net", and she ran down the hill making a noise just like the plane, /n/n/n/n/n/n/n/n/n/. She snatched up the net and just as the plane nearly hit the water, she held out the net and the plane nose-dived straight in. "Well done", Uncle Nick said, "I think that's enough of that noise for today". "Oh we think it's a nice noise", the children said. They thought it was really good fun chasing the plane across the park. "Come on, I think we better let the fishermen have some peace", Uncle Nick told them. So all the children went charging back across the park to Neil's house, pretending they were toy planes with their arms outstretched like wings, flying this way and that and making a noise like a thousand model planes /n/ /n/ /n/ /n/. LETS ALL PRETEND WE'RE MODEL PLANES.

Phoneme awareness for /n/.

Noisy nose-dive Nancy no nest now nasty net noise nice neck nose name night not nail nap nappy naughty near nod nine new next necklace nightmare number note nursery nut nit Nana Natasha Neil Nick Nigel

Visual encoding for /n/ (plus /s/ /a/ /t/ /i/ /p/).

ant in an tin pin pan nap nip spin nit

Story 7. Clip Clop and the King.

This is a story about Clip Clop, a sad grey donkey, and his mistress Carmen, the Spanish dancer. Carmen dances and plays the castanets that go /ck/ /ck/ /ck/ /ck/. Can you go /ck/ /ck/ /ck/?

Carmen is practising her dance because tonight she is going to dance for King Carlos who has been very ill with a bad cough and cold. She is practising kicking and clicking the heels of her shoes and swirling her bright red dress as her castanets go /ck/ /ck/ /ck/ in her hands. But poor old Clip Clop isn't happy at all because all he can think about is the long trek up to the castle in the clouds with Carmen on his beck. This year he's been feeling very old and very tired and his back has been killing him.

As Clip Clop clip-clopped up to the castle, Carmen tried to cheer him up clicking her castanets /ck/ /ck/ /ck/ and singing a happy song but it still seemed an awfully long way. WHAT SOUND DID CARMEN'S CASTANETS MAKE AS SHE RODE UP THE HILL ON CLIP CLOP'S BACK?

When they arrived Carmen climbed down, held out her skirt each side and made a deep curtsy to the King. Clip Clop was so exhausted he fell down on his knees and rested his head on the King's foot.

"Well, I never did!" exclaimed the King, "I've never seen a donkey bow to a King before". He didn't know that Clip Clop wasn't bowing at all and he was only on his knees because his legs were too tired to keep him standing up. Carmen started dancing, whirling round and round and clicking her castanets, /ck/ /ck/ /ck/ /ck/, so the King wouldn't notice that Clip Clop had fallen fast asleep on his foot. When she finished, she curtsied again to the king and at that moment Clip Clop woke up and looked about him in surprise. The King laughed when he realised that Clip Clop had been asleep on his foot all the evening. "You must be getting old and tired just like me" the King said to Clip Clop, " so I suggest, that you come and live with me here in my castle and keep my feet warm and I'll give

Carmen one of my motor cars so she can come and visit you. So they all lived happily ever after, Carmen driving her new cream coloured car to visit Clip Clop who was keeping the King company up at the castle. LET'S PRETEND WE ARE PLAYING CARMEN'S CASTANETS.

Phoneme awareness for /ck/.

Clip Clop Carmen Carlos cough cold clicking castanets cat café castle scouds car clock case cup coffee cake clang courtyard courtiers candles curtsy clapped cried cream coloured company carrot King keep kick kangaroo key kitchen kitten kiss kennel kind kite kerb kid kettle Christopher Katie Karen Katherine Kevin Keith Carl

Visual encoding for /ck/ (plus last 6 phonemes).

Cat cap can kick sack skin sick snack tank kin kit skip pick Nick pack stick

Story 8. /e/ for Egg.

Mrs Everoy, had been up since 6 o'clock this morning because on a farm you have to get up very early to feed all the animals. The chickens had laid an extra lot of eggs this morning, they were lying everywhere, all over the hen house and Mrs Everoy's son Eric had helped her put the eggs in the basket. "Let's make a cake with all these extra eggs", she said to Eric, as she cracked an egg into the pan for breakfast. "You can help me crack the eggs into the bowl and we can take it over to Auntie Elsie's when it's cooked". When they finished breakfast Eric and his mum started making the cake. First they put the flour in the bowl and then Mrs Everoy showed Eric how to crack the eggs. "You have to hold the egg in one hand and tap it firmly on the edge of the bowl, then put your thumbs each side and crack and open the egg and let it plop into the mixture", she explained. Eric became quite an expert at egg cracking. SHALL WE TRY TO CRACK AN EGG OPEN? TAP /e/. That's how Eric does it, he knows that /e/ is the sound that comes at the beginning of egg, so as the egg plops into the bowl he says /e/ for egg. He had to crack 4 eggs, so let's do 4 the same as Eric. Tap /e/, tap /e/, tap /e/, tap /e/. Excellent.

Mrs Everoy put the mixture in the electric mixer and whizzed it up. Then she emptied it into a cake tin and put it the oven. In no time at all, there was a delicious smell coming from the oven and the cake was ready. On the way to Auntie Elsie's, Eric said " Don't forget to tell Auntie Elsie I helped you make the cake". "I will" said his Mum, "and you must tell her what you say when you crack the eggs into the bowl". "Yes, I'll tell her it's /e/ for egg and when we have a piece of cake I'll tell her it's /c/ for cake" laughed Eric.

Phoneme awareness for /e/.

Egg extra everywhere Eric edge expert exciting escalator elevator excellent electric empty engine elephant elbow elm elf excuse-me exit end everyone envelope everything Elsie Emma Eddie

Visual encoding words for /e/ (plus all the phonemes to date).

Pen pet net ten ken tent neck set peck sent pest

Story 9. /h/ /h/ /h/ hopping.

Harry found very difficult to hurry but today was sports day and if he didn't hurry up he would not only miss it himself, he would make his sister Hannah late as well. As usual, as they walked up the long hill to school Harry trailed along behind Mum and Hannah so slowly they had to keep stopping and calling "Hurry up Harry, how do you expect to win your hopping race when you can't even walk fast enough? "/h/ /h/ /h/" huffed Harry, "it huffs me out walking up this hill". Hannah was running up the hill so fast that she was puffed out as well, so she sat on someone's wall going /h/ /h/ /h/ to get a breath back. HOW DO WE GO WHEN WE GET OUT OF BREATH?

Soon they arrived at the sports field and all the children were wearing their shorts and trainers ready for the races. When it was their turn for the hopping race, Harry and Hannah lined up with others at the start and Hope's Dad started them off with a wave of his hat as he shouted, "Start hopping now". Hannah hopped very fast because she had practised so hard but Harry was trailing behind. He was puffed out already and he kept stopping and going "/h/ /h/ /h/ I can't go any faster". Hannah was already at the finishing line and everyone shouted "Hurrah for Hannah, well done Hannah". All Hannah could say was "/h/ /h/ /h/" because she was so puffed out. But when she got her breath back she turned round to see Harry still hopping and huffing and puffing. "Hurry up Harry" she shouted for the hundredth time that day. "Hurry up Harry" everyone joined in. Harry made a last big effort and even though he was the last one, he hopped all the way to the line. "Hurrah" all the children and teachers shouted "he made it in the end". But all Harry could say was, GUESS WHAT? YES, /h/ /h/ /h/ because he was completely puffed out.

Phoneme awareness for /h/.

Hot holiday hurry hungry hair hopping he hands honey house hill huffed hoping had hat head hard hurrah hallo happy heavy hedgehog hospital horse her his hay help hatch him hurts hen hit hole hippopotamus Henry Holly Hazel Harry Hope Hannah Husnien Harriet

Visual encoding for /h/ and all previous phonemes.

Hat hen hit hint his has hip

Story 10. Randolph.

Robbie was having really good time playing in the garden, rushing round with his toy racing car, when it started to rain. Robbie's Dad called him inside and told him to go up to his room for a rest. "Go to your room and play quietly for a little while" he said "then when it stops raining we'll take Randolph out for a walk down the road and along beside the river". "Rrrr" said Randolph the dog. It was past his walk time and he was fed up. "That's enough of that growling, Randolph", said Dad, "I know you love chasing the water rats and rabbits down by the river, but you'll just have to wait until it stops raining". Robbie went to his room and looked out of the window. "I'm fed up with this" he said to Randolph, who had followed him. "Rrrrr" said Randolph in agreement. WHAT DID RANDOLPH SAY?

Then Randolph had an idea, he picked up the rug with his teeth and took it over to Robbie "Oh, you want to play a game, do you Randolph?" Robbie laughed. So he grabbed hold of the rug and started to pull. "Rrrrrr" growled Randolph, this was his favourite game. The more Robbie pulled one way, the harder Randolph pulled the other. "Rrrrrr, rrrrrr, rrrrrr. Randolph loved every minute of this when rrrrrip went the rug and it tore right in half. Dad came marching into the room, "What's going on here?" he said crossly, "Just look at that rug, it's ruined". "It wasn't my fault" said Robbie "it was Randolph's idea". "It takes two to rip a rug in half, you are both as bad each other", said Dad. "Rrrrrr" Randolph agreed. "Lucky for you it's stopped raining and we can all go down to the river", Dad said looking out of the window. "Hey, Robbie come and look at this", he called, "there's a rainbow right across the sky and it looks like it goes down to the river. Get your wellington boots on and we'll see if we can find the end of the rainbow. WHAT DO YOU THINK RANDOLPH SAID ABOUT THAT?......Rrrrrrrrrr!

Phoneme awareness for /r/.

Really rushing racing round rain room rest road river rat rabbit roller skates rattling rocking horse racket read rug red ripped right ruined run rainbow radio robin rock rose rough ribbon ride rut ring rag Rebecca Reiss Robbie Robin Rachel Richard Ryan Randolph Robert Rhoda

Visual encoding for /r/ plus previous phonemes.
Rat rip ran trap trip tar rap trick rest

Story 11. Mmmm Yummy.
On Monday morning in the summer holidays, Michelle asked her friends round to play at her house and her mum took them all swimming. They had a great time messing about in the water, splashing each other and making a lot of noise. Michelle's mum tried to calm them down as they were getting too excited. "You'll make the life guard get mad if you do too much splashing and messing around" she said "because you'll upset the little children who can't swim yet". Moriah, one of Michelle's friends, said, "My mum always makes me stop splashing my little brother Mark". "Well my dad sometimes splashes **me**", said Matthew, Michelle's other friend. "OK, we've all had a good time, so I think we'll have one last swim and then get dressed", Mum said. She wanted to hurry and get to the market to by something nice for them all for their evening meal. When they were in the car on the way to the market Michelle's mum asked Matthew and Moriah what their favourite meal was. "Mmmmm", said Moriah, "my favourite meal is a hot dog, a big sausage in a bun with as much tomato sauce as I can have in it mmmmmmm". "Mmmmm, wel my most favourite of all is meatballs and spaghetti" Matthew said, licking his lips, mmmmm, well you know what I like mum", Michelle said rubbing her tummy, "I like munching on an enormous hamburger, so big I can hardly get it in my mouth, with lots of melted cheese on it, mmmmm". "Well, who likes chips?", Mum asked looking at them in the rear view mirror. "Mmmmm, me" they all said from the back of the car. ANYONE WHO LIKES CHIPS SAY MMMMMM. LET'S TAKE IT IN TURNS TO SAY OUR FAVOURITE FOOD AND ALL THE OTHERS SAY 'MMMMMM'.
Visual encoding for /m/ plus previous phonemes.
Man mat arm ham men ram map am met smack Pam Tim Mick Sam

Story 12. Daniel's Drum.
This was the day that dad had been dreading. The time had come to decorate Daniel's bedroom and that meant clearing out all the toys and furniture and taking all the pictures off the walls. "Come on Dan", he said, "you can help me. I'll take all the pictures down and you sort out your toy cupboard. Daniel's toy cupboard was a dreadful mess, he could hardly remember what was at the back of the shelves because he had just dumped his toys in there ever since he was a baby. Well, he started to pull the toys out when he suddenly saw his favourite old tin drum. He just dropped everything else on the floor, he put the drum cord round his neck, searched for the drum sticks which he found on the shelf behind the donkey, and he started to play d,d,d, d,d,d, d,d,d. He remembered how much he used to love this drum when he was little, he had it for his birthday when he was two. Ddd, ddd, ddd, he went marching round the room banging on the drum. His dad, who had been in the shed looking for his tool-box, came in and said, "It doesn't sound as if much tidying up is going on around here". Ddd, ddd, ddd "I think I'm going to be a drummer in a band when I grow up", a delighted Daniel shouted over the din he was making. SHALL WE ALL PRETEND WE ARE PLAYING A DRUM LIKE DANIEL? "Let's make a deal" Dan's dad said. "You tidy up your toys quickly, I'll move your desk and dinosaur picture and before we start decorating I'll get my guitar and you can accompany me on your drum". Daniel and dad rushed round at top speed clearing up the room and then dad played their favourite songs on the guitar with Daniel keeping time on his drum. (to the tune 'The wheels on the bus go round and round' or similar) ddddddd ddd ddd.)

Visual Encoding Words
Red dad hid sad mad sent din end had did drip hand sand and kids Dan Ted Sid

Story 13. Gurgle.
Goldilocks (her Gran called her Goldilocks because of her curly, golden hair) was staying at her grandma's house when the tap broke and the sink in the kitchen started to leak. Water was gushing down the plug-hole, going g g g g g, and dripping out of the pipe underneath, making a big pool of water. The g g g g g sound, made Goldilocks giggle but Grandma was very upset and phoned Gary the plumber to come and fix it. Gary arrived wearing his dungarees, galoshes and rubber gloves. He looked at the water going g g g g g down the sink. Then he looked underneath and heard it going g g g g g down the pipes and he saw the drips, dripping onto the floor and he said, "Don't get upset Gran, I'll just grab my spanner and I'll fix this in a tick. Goldilocks said to Gary, "Listen Gary, I can do the sound the water makes going down the plug hole, g g g g g". CAN YOU MAKE THE SOUND THE WATER MAKES? "That's a great sounding gurgle, Goldilocks", Gary said as he gripped the nut with his spanner and tightened it up. "Look at that, the dripping has stopped. Now I'll put a new washer on the tap so we can turn it off". When Gary turned the tap off, all the animals in Gran's garden looked up to see why the g g g g g sound had stopped.
Can you see any animals in the picture that begin with /g/? (goat, goose).
Can you see one that has a /g/ at the end? (pig).
Can you see anything else that begins with /g/? (grass, green, gate).
(Story sentence for following day. What's this? It's **'Gran's pig'**.)
Visual encoding words.
Pig dig get gran gas rag keg gag nag tag grip

Story 14. On Off.
Oscar and Olivia have got bunk beds. Olivia sleeps on the top one and Oscar sleeps on the one underneath. Sometimes, after their mum has kissed them goodnight and told them to go to sleep, Oscar switches the light on and starts reading his book. Olivia says "Oscar, you know you are not allowed to have the light on, it keeps me awake" and she leans down and turns it off. Oscar waits for a few minutes and when he thinks Olivia is asleep, he switches the light on again. But before he gets a chance to read his book, Olivia leans down and .....Guess what she does? She switches it off. On off, on off, CAN YOU HEAR THE SOUND /O/ AT THE BEGINNING OF ON AND OFF? LET'S PRACTISE SWITCHING THE LIGHT ON AND OFF SAYING /O/ FOR ON AND /O/ FOR OFF. Soon their mum comes back and says, "Now look here you two, just settle down. I've brought you a torch Oscar, so you can read your book for five minutes with the torch and it won't disturb Olivia". Thanks mum, " Oscar said, "I'll just turn the light off (together)/o/ and then I'll put my torch on (together) /o/. But soon he was very sleepy, so he turned his torch off and went fast asleep like his sister.
Visual Encoding Words.
Dog on hop hot pot sock stop top drop pop rock mop rod clip clop tic-toc spot cost

Story 15. Up Umbrella.
The children's auntie had unexpectedly bought them both a pair of new 'galoshes'. That's what Auntie called them but the children called them wellington boots or just 'wellies' for short. They couldn't have got them on a better day because it was pouring with rain.

Just the sort of day to try out wellington boots. It was unusual for the children to want to go out in the rain but it can be good fun if you can splosh in the puddles. They took an umbrella each and their Uncle helped the children to put them up, as they were a bit stiff. "Look, this is how you do it", he said, "you press the catch down and u,u,up goes the umbrella". SHALL WE PRACTISE DOING IT? PUSH THE CATCH DOWN AND U,U,UP GOES THE UMBRELLA. Even the bugs and slugs loved getting wet in the rain and they hung upside down from the flowers and the trees. When the children finished playing outside, under their umbrellas, they went inside and had to get undressed and into their pyjamas because even though they had their umbrellas up they still got soaked from kicking up the water in the puddles with new wellies. They had had such fun they rushed around in their pyjamas, driving their mother mad, saying, "u,u,up umbrellas". CAN YOU HEAR THE SOUND THAT COMES AT THE BEGINNING OF UMBRELLA? YES, IT'S /U/ /U/ /U/. LET'S PRACTISE PUTTING OUR UMBRELLAS UP WITH THE SOUND /U/.

Visual Encoding Words.
Mum up run cup us rug mud nut drum gun duck truck gum, bug snug slug cut yum-yum.

Story 16. Lovely Lolly.
Lucky Linda and Lewis have both got lovely lollies to lick /l/,/l/,/l/,/l/. They have had long pieces of liquorice and lots of delicious lemonade at Laura's party. It's dark outside because it's winter-time, so they have the lights on and a big log fire. We can't see Laura because she is looking for her Lego, she had built a lovely castle but it has got kicked over and all the bits have got lost under the chairs. Larry is playing blindman's bluff and laughing because he can't catch anyone. WHY CAN'T HE CATCH ANYONE? YES, BECAUSE THEY ARE EITHER LICKING LOLLIES OR LOOKING FOR LEGO. Let's pretend we're licking lollies and make the sound /l/ /l/ /l/. Laura let her ice cream fall on the floor and now it's melting, she's too busy looking for Lego to lick ice creams. Her mother won't be very pleased when she sees melted ice cream on the carpet.
Visual Encoding Words.
Lick luck melt log lamp leg lego lot let lip lid lug slap slip slop plop ;lan land glug lost gold told got lad lap milk

Story 17. Ffffffish.
Fiona and her family, had such fun at the seaside in the summer holidays. One day, Fiona spent the whole day making sandcastles on the beach. She made four turrets with flags stuck in the top of each one and she found five shells to put along the front. Freddie caught a fish with his fishing rod and he brought it in a bucket so that Fiona could let it swim in the moat round her castle. Frank had been swimming with fins on his feet and a mask on his face so he could see under the water. But all he found was a skeleton of a fish. The children had a big inflatable fish that their Mother had blown up for them in the morning. They had fun floating on the top of it in the water and it helped them to swim. But in the heat of the sun the stopper flew out of the fish and the air that was inside started to flow out, /f/ /f/ /f/ /f/ and the fish started to go down flat. CAN YOU MAKE THE NOISE OF THE AIR COMING OUT OF THE INFLATABLE FISH? /f/ /f/ /f/ /f/. "Oh no", gasped Frank "Mum will never have enough puff to blow it up again and it's my turn to have some fun floating on it with my fins on". "I think I've got just enough puff left after swimming, to blow it up again", his mother said. And she huffed and she puffed and blew the fish up. Frank called out from the sea, "I hope it won't go down and make that funny noise again while I'm on it. "I don't think so", his Mum laughed,

"but you'd better not go out to deep just in case it does go f f f flat. But it never did go (together) /f/ /f/ /f/ /f/.

Visual Encoding Words.

Fun if off fin fit far fur fat fig fog golf fad from film fax fan flag soft huff puff for find Fred

Story 18. Bat and Ball.

It was a beautiful day in the park and the boys were playing baseball. Well, Barbara wanted to play with the boys so she hung around and watched for a little while before she asked if she could play because she was a bit shy. Bob was batting and Billy was bowling the ball. Billy had a big baseball glove on so he could catch the hard ball when Bob hit it with the bat /b/. Billy bowled the ball really fast and Bob bashed it with the bat /b/ and it bounced off into a big bush, just missing a bee that was busily buzzing round the flowers and a bunny, that bobbed back into his burrow. "Wow", said Barbara, "that was brilliant Bob, please may I have a go?" "Wouldn't you rather go and blow bubbles with Barry"? Bob didn't think girls with bows in their hair could play baseball. "No I would not" Barbara replied "I can hit a ball with a bat just as well any boy". So they let Barbara play but Billy tried to bowl the ball really fast to get her out but she bashed it so hard it nearly knocked the birds off their branches. WHAT SOUND DID THE BALL MAKE WHEN BARBARA HIT IT WITH THE BAT? YES, /b/. After that they let Barbara play on their team "You're better at baseball than my brother Barry", Bob said in amazement.

Visual Encoding Words.

Bat bib crab band bob belt bolt bag bin bus bun bit but bud bad bunk bed bold tub brick black block gab dab

Story 19. Ai—Pardon!

Aidan had a terrible pain in his ear. He couldn't hear very well. Every time his mother told him to do something he said "ai" and his mother said, "You shouldn't say 'ai' you should say pardon when you don't hear someone speak". "Ai", said Aiden rubbing his ear. "I think we better go and see Dr Ail right now", his mum said, "even though it's pouring with rain". Well, Aiden and his mum paid for their tickets and caught the 10 o'clock train to the doctors. Dr Ail said, "Did you come by train, Aiden?" "Ai", said Aiden. "You mean pardon", said his mother, "I've told you, it's bad manners to say 'ai'." "Do you have a pain?" said Dr Ail. "Ai", said Aiden. "Pardon" said his mum. "Well, I don't think it's your brain", said Dr Ail, "I think you have some wax in your ear and that's why you can't hear". WELL, WHAT DO YOU THINK AIDEN SAID? AI, YES. In two minutes Dr Ail put the syringe in Aiden's ear and cleared out all the wax. "Pardon", said Aiden. "Don't you mean 'ai'?" said the doctor. "My mother said it's rude to say 'ai', I should say pardon", replied Aiden, who could hear perfectly well now. His mother couldn't believe her ears! "Thank you very Doctor" she said, "you have not only cured Aiden's pain but you have cured his bad manners as well". But I'm afraid she spoke too soon, because Aiden, who was gazing out of the window at a snail, wasn't really listening, and what do you think he said? Yes, "ai".

Visual Encoding Words

Aiden pain rain paid train main brain snail maid rail raid claim sail hail mail tail aid aim laid gain pail

Story 20. Jolly Jelly.

Jodie was looking after her little sister Jade while their mum was in hospital and today they thought they would something special for tea. "I know" said Jodie in the morning as she helped Jade to get dressed in her jeans and jumper, "let's make a jelly". "Can we make a red jelly like my jumper?" Jade asked. "Of course" replied her sister, "but we must make it this morning and pour it into the jelly mould and leave it to set in the fridge so it's ready for tea time. At 3 o'clock they tested the jelly and found it was set and ready to tip out onto a plate. "It's a bit like making sandcastles", Jodie told Jade, "you just turn it upside down and it comes in the shape of the mould, there, that's just the job". Jodie carried the jelly over from the fridge and it jiggled and joggled and wibbled and wobbled. "Look", said Jade, "I can jiggle like a jelly" /j/ /j/ /j/ /j/. CAN WE DO THAT? /J/ ETC. "You be careful with those bare feet", said her big sister, "or you will jump on that toy jet plane and knock the jug of juice and the jam off the table". "No I won't" answered Jade as she jiggled round the table. "If you jiggle that much before you've had any jelly, how much will you jiggle after you've had a jolly big bowl full?" Jodie said. "THIS MUCH", Jade jiggled so much it made her voice go all jiggly. LET'S SEE IF WE CAN JIGGLE SO MUCH IT MAKES OUR VOICES GO JIGGLY, /J/ /J/ ETC.

Visual Encoding Words.

Just job jet jug jam jump jig jif jut jot jog Jim jumbo

Story 21. Oh (oa) Dear!

Owen and Rowena turned off the road into the field with the pond, to have a picnic. Owen carried his boat to float in the pond and Rowena carried a loaf and a load of other things in her basket. She was roasting in her warm coat but she was going to take it off when they reached the pond. But 'Oh' when they got there they saw a big oak tree had fallen over in the wind and trapped a goat underneath it. He was moaning and groaning because he'd been stuck there all night with the toads croaking by the water. "I know what to do" boasted Owen, "I'll put some water in my boat for the goat to drink, then he'll know we are his friends. Then I'll go round behind him and push his bottom down and you pull his horns and we'll see if we can pull him out from under the oak tree." They pulled and pushed while the stoats and the toads looked on and then they pushed and pulled some more. Then oh my goodness the goat came free and roamed off across the field on very wobbly legs. "Oh what an adventure" the children laughed "now we can have our picnic".

CAN YOU HEAR THE 'OA' SOUND THAT COMES IN THE MIDDLE OF GOAT AND BOAT AND OAK. WHAT WOULD YOU SAY IF YOU SAW A GOAT STUCK UNDER AND OAK TREE, I'D SAY "OH". WE WRITE IT LIKE THIS 'OA' IN MIDDLE OF B OA T, G OA T, AND OA K. YOU SAY 'OA' AS I WRITE IT.

Visual Encoding Words

Boat float loaf load coat goat stoat toad croak oak moan groan boast roam foal loan moat foam coast coal goal bloat gloat soak

Story 22. Ie-Sir

Tyrone was going to be a page-boy at his big sister's wedding and he had to wear a sailor suit to look smart. His dad had told him that he used to be a sailor in the navy when sailed round the world before Tyrone was born. His dad had said "When the officers who were in charge told you to do something, you had to salute smartly and say 'ie ie sir'. "I'm going to say that when I wear my sailor suit", Tyrone said, practising his smart salute. "Go on, tell me to do something dad". "Go and try on your sailor suit **now**" his father commanded. "ie ie sir" replied Tyrone saluting. When Tyrone was practising saluting in the mirror, Spot the dog thought it was a game and kept jumping up, dying to join in. Tyrone was trying to make Spot lie down when his father spied him in the bathroom and told him to tie his shoe laces and come down to dinner. WHAT DO YOU THINK TYRONE SAID? YES "IE IE SIR". LET'S SEE WHO CAN DO THE SMARTEST SALUTE AND SAY IE IE.

Visual Encoding Words

Lie tried flies die spied pie tie replied shied

Story 23. Lord 'ee-or' the Donkey

Lord ee-or was a donkey that lived in a field with lots sheep and field mice and bumble bees. He was very happy except when there was a storm with pouring rain and thunder and lighting; that's when he got really frightened. On television at Doreen's house, the weather man said there was going to be a big storm, so Doreen and her brother Orvil and their friend Pandora thought they better go down to see Lord ee-or and make sure he had everything he needed. Lord ee-or was trembling when they arrived and said "ee-or" in a very trembly way. He had seen the thunderclouds and was scared that the lightning might strike the beech tree and trap him underneath because he had heard about the goat getting trapped under the oak. The children untied his cord and set him free, the said "Lord ee-or we are going to take you to a stable to stay with some horses until the storm has passed over". "Ee-or, ee-or" Lord ee-or waggled his ears enthusiastically, he was very keen indeed to shelter from the storm with some horse friends. "Ee-or" he said, meaning, "thank you". HOW DOES LORD EE-OR SAY THANK YOU? IS THERE AN EE OR AN OR IN 'STORM'? IS THERE AN EE OR AN OR IN TREE?

Visual Encoding Words

'**ee**' - Bee see greet meet feed green seen free tree need keen indeed flee seed leek heel deer peep glee beech steer reel steed breed heed beef been seen deed peel
'**or**' - Lord storm Orvil Pandora for cord order motor porch nor sort torch

Story 24. **Zzzzzzooooommmmm.**

It was a still, hot summer afternoon and Zandra was playing in her Gran's garden. She had a big bucket of water that Gran had given her to water the flowers. She scooped out a cup full of water and was just going to tip it over a pretty red flower when she heard a z z z z z . A big yellow and black striped bumble bee zoomed down onto it and put it's head right inside it, buzzing his wings up and down. HOW DID IT GO? zzzzzzzz. Then it backed out of that flower and zig zagged round and then dived into a big blue one going......yes zzzzzzzz. "What are they doing" Zandra asked her Gran, "zooming into the flowers like that?" "They are collecting nectar from the middle of the flower and then they take it back to the bee hive where they live and turn it into honey" Gran told her. "Do they sting you?" Zandra asked. "They don't want to" Gran replied, "because if they do, they die. So they will only sting you by accident". Just at that moment, a bee zoomed into Zandra's frizzy hair and Zandra could hear it buzzing and she panicked. Zzzzzzzzzzzzz. "Help Gran there's a bee in my hair" she squealed. "Just stay very still" her Gran said "and it will soon realise that you are not a flower with nectar in it and it will fly away". WHAT WOULD YOU DO IF A BUZZING BEE ZOOMED INTO YOUR HAIR*? Zzzzzzzzzzz (to which Robbie replied "I'd make it go ggggggg down the plug hole!")* Well, Zandra stood very still, biting her fingers, until suddenly she heard zzzzzzz and the bee buzzed off, zig zagging round the flowers again, before zipping back to the hive. "That was really scary Gran", she said, "hearing a bee going zzzzzzz in your hair". HAVE YOU SEEN THE BIG BUMBLE BEES BUZZING ROUND THE FLOWERS? WOULD YOU BE SCARED IF A BEE WENT ZZZZZZZ IN YOUR HAIR?

DO YOU THINK ZANDRA WAS BRAVE, STAYING STILL WHILE THE BEE WAS GOING ZZZZZ IN HER HAIR?

Visual Encoding Words

Buzz fizz fazz fez zest zoo zap zonk zebra zig zag zip

Story 25. Willy and Tweet

Willy was walking to work last week, on a Wednesday. He was wearing his warm, woolly coat and a green and red hat because it was a cold, wet, wintry day. He had his umbrella up to keep off the rain. Tweet was a robin redbreast and he was mending his nest in a weeping willow tree, when the west wind started to blow. First it started to blow gently, wh wh wh. CAN YOU BLOW LIKE THE WIND? WH WH WH. Then it started to blow harder, wh wh wh. CAN YOU BLOW A BIT HARDER? WH WH WH. The hat on Willy's head went wibble wobble in the wind. Tweet's nest in the weeping willow tree went wibble wobble in the wind and Willy's umbrella turned inside out. "I wish I was wearing wellies" wailed Willy. Then Willy's hat went whoosh, up in the wind and knocked poor Tweet's nest right out of the weeping willow and landed upside down on the branch. "Mmmm that looks nice and warm", thought Tweet and flew into Willy's hat and settled down for forty winks. "Oh well, I'll just have to buy a new hat", said Willy as wind blew him on him on his way to work. HOW DID THE WIND BLOW GENTLY? HOW DID IT BLOW HARDER?

Visual Encoding Words

Tweet wet west wind wail weep wee wag wink went week win wagon wax web weed wig wam wit wisp wick

Story 26. Strong Man

It was Saturday morning and Bing and is friend were playing ping pong but after a while they got fed up with that and wanted to do something else. So they put the television on to see if there was a cartoon but what they saw was even funnier than a cartoon. It was strong men having a competition to see who was the strongest.

Bing and his friend laughed their heads off when the men picked up the heavy weights called dumbbells. The stood with their feet apart and lifted up the long pole with a very heavy ring on each end and they pulled a funny face and made a funny noise because it was so heavy /ng/ /ng/. Bing and his friend rushed to get some mops and brooms that hung in the cupboard so the could copy the strongest man called the 'The King' on television. The lifted their long poles going "ng" in the back of their throats and making strong man faces. SHOW ME HOW YOU WOULD DO IT IF YOU WERE A STRONG-MAN. /NG/. Even the 'jack in a box' sprang out on his spring going /ng/. All of a sudden there was a bang and the strong man called 'The King' dropped a heavy ring on his foot and he was jumping about going /ng/ /ng/. The announcer came on and said, "If there are any children watching they mustn't try and lift heavy things at home or they might drop them like the King and bang themselves". But the boys long poles weren't really heavy at all, they were just pretending to be strong and make strong men faces, going /ng/. LET'S SEE IF WE CAN LIFT HEAVY WEIGHTS. /NG/ /NG/.

Visual Encoding Words

Bing ping pong strong long ring hung king sprang spring starling wing sing long bang jumping bingo mango tango swing sang rang ding dong rung hang gang fang lung string

Story 27. Vic's Van

Vic's dog Kevin was a very clever sheep dog. He was famous for rounding up the sheep in the fields ever so quickly and he'd even been on television. However, he woke up yesterday and found he couldn't walk on one of his paws. He looked up at Vic with big sad eyes and showed him his poorly paw. "This looks like a visit to the vet", Vic said holding Kevin's paw gently in his hand. He carried Kevin out to his van and put him on the back seat. "You won't be able to run round the fields and down to the village with your friend Spot today, old boy" he said affectionately to his dog, as he drove his van down the road. 'vvvvvvvv' the van went as it bounced along the road. Kevin looked out of the window and thought 'I'd much rather be running along on my own, this van is very noisy going vvvvvv. HOW DOES THE VAN SOUND? CAN YOU HEAR THE /V/ SOUND AT THE BEGINNING OF VAN? Soon they arrived at the Vet's, which was just behind Val's vegetable shop. The vet was surprised to see Kevin looking so poorly as he was usually full of vim and vigour but he soon found the trouble, a sharp cut in Kevin's paw. He stitched the cut together and told Vic that he must carry Kevin round in his van for a few days as he mustn't walk on his bad paw. On the way home Kevin put his head under a cushion on the back seat so he wouldn't hear the noisy van going (together) vvvvvvvvvv.

Visual encoding Words

Vic Kevin ever television visit vet van visitor vim vicar velvet venom vest video victim very

Story 28. Cuckoo.

Una loved staying at her grandma's house because she had a cuckoo clock. Every hour a little toy bird, like a cuckoo, would spring out and say 'oo oo' to tell you what time it was. When it was one o'clock it would just say 'oo oo' once but if it was twelve o'clock it would say 'oo oo' twelve times. Grandma always gave Una her favourite food, spaghetti hoops, which she was allowed to eat with a grandma's special silver spoon. It was nearly twelve o'clock and grandma was busy knitting Una a wool cardigan, so Una quietly took her book and went in grandma's cuckoo clock room to wait for the cuckoo to come out. Spooky the cat was waiting too, as he like to jump up and try and catch the bird when it popped out of the clock. Suddenly there was whirring noise, a little trap door opened and out popped the cuckoo calling 'oo' 'oo' twelve times. HOW DID IT GO?

Visual Encoding Words

/oo/ cook book hood took look stood foot soot hook shook rook

/oo/ food spoon good wool room mood too soon noon roof shoot moon fool boot boo loot tool pool soot woo hoot hoof loop toot zoom zoo

Story 29. Yum Yum

Yola loves yellow yoghurt and she has it nearly every day. Sometimes it's banana flavour, sometimes it's apricot, sometimes it's mandarin orange and sometimes it's mango. Mango is the best Yola thinks. The other day Ray asked if he could try Yola's mango yoghurt and she said, "yes, of course you can", and Ray thought it was delicious. "I always ask my mum to buy yellow yoghurt but she always forgets", Ray told her today. "Well, you should write it on her shopping list, like I do", Yola replied, "I write /m/ for mango and then I write /y/ /o/ /g/ for yog because I can't spell all of yoghurt. "But you've got banana yog today", Ray said, "what do you put for banana?" WHAT LETTER DO YOU THINK YOLA PUTS FOR BANANA? YES /B/. AND WHAT SOUND COMES AT THE BEGINNING OF YOG? YES /Y/ IT'S /Y/ /O/ /G/ FOR YOG. Yola wrote /y/ /o/ /g/ on the board for Ray to copy so he would be able to put it on his mum's shopping list.

Visual Encoding Words

Yola Ray day yes yog yelp yet yum yap lay may hay

Story 30. X-Ray

On Tuesday morning Max was playing ray guns with his friend Rick. They were racing round hiding behind trees and then jumping out and shooting each other with their ray guns that made a noise like this ks ks ks. Max thought he'd climb up a tree to hide but all of sudden the branch broke and he tumbled down and fell on his arm. "ouch ouch ouch" he cried as his dad rushed over to help him. His dad called a taxi to take them to the hospital where a nurse took a picture of his arm with an x-ray machine. She explained to Max, that it takes pictures of the bones inside your body. Each time she took a picture it made a noise like Max's ray gun, ks ks ks. When the nurse examined the pictures of Max's bones she said "Well Max, I don't think you'll be climbing any more trees for a while because this x-ray shows that the bone in your arm broken. We'll have to put a very stiff bandage on it to help the bones grow back together again". Max was very brave even though he wanted to cry he didn't but on the other hand he didn't feel like laughing either even though Rick was trying to cheer him up by firing his ray gun at him going ks ks ks. The doctor said it would take six weeks for the broken bone to join together again and then Max would have to have another x-ray to see if it was mended. LET'S PRETEND OUR X-RAY GUNS CAN TAKE A PICTURE OF PEOPLES BONES INSIDE THEIR SKIN. KS KS KS KS.

Visual Encoding Words

Max taxi exam six box exit extra lax fax tax vex

Story 31. Choo-Choo Train

The children from Chichester were having a special treat today because they were having a ride on an old-fashioned steam train. Charlie the driver had chucked loads of coal into the engine to make the steam come out of the funnel and drive the wheels round. As the train chuffed off down the track it went ch ch ch ch and that's why the children called the choo-choo train. LET'S DO THE TRAIN NOISE, CH CH CH CH. The choo-choo train chugged past the church ch ch ch ch but had to slow down ch ch ch and stop - because some chickens and baby chicks, that had just hatched from their shells, were cheeping near the track and Charlie didn't want to squash them with his engine wheels. A cheeky mouse tried to creep onto the choo-choo train but Charlie picked him up by his tail and said "Children only, no cheeky mice on my train" and he chucked him off and the poor little chap landed on his chin in bunch of flowers. But 'Cheeky' was too clever for Charlie, he ran up a chopper that chops wood and one, two, three, he jumped through the window of the coach, onto Chang's head. All the children cheered the champion mouse and they shared their chocolate and cheese with him as the choo-choo train chuffed off again (together) ch ch ch ch ch ch.

Visual Encoding Words

Chuck choo chicken chick cheeping children cheer chap chin bunch chop Chang champion sandwich lunch chip crunch chomp munch such rich clutch chug chat coach chum chunk chapel cherub chest catch fetch match hatch

Story 32. Sh...She's asleep

Sasha's mum Sheila, had just had a baby. It was a girl and Sacha had helped choose the name Natasha, for her. Sasha wished that Natasha was still inside his mum's tummy because now she's been born he has to be quiet all the time. As usual, he was just starting to have some fun playing shops when Sheila put Natasha down to sleep and said, "Ssh, you'll wake Natasha with that cash register bell. She's got a rash and I want to see if these new soft sheets help her to sleep." "Aw it's so boring having a baby around", moaned Sasha, bashing his cash register keys even harder and shovelling the cash into the draw and slamming it shut. "I'm pretending I've got a fish shop and a ship is catching fish and giant sharks in the sea for me to sell in my shop." "Well, if you do it quietly, I'll play shops with you", Sheila said. "Do you have any shell fish, Mr Fishmonger?" she said, pretending to be a customer. "Yes, I've got these", said Sasha, putting some shells in a bag for his mum, "that'll be 75 pence please". Sheila pretended to give Sasha some money and as he opened his cash register the bell went 'ping' and Sheila said "Sshh" just as Natasha started to cry. WHAT DO YOU THINK SASHA SAID TO THE BABY TO MAKE HER STOP CRYING? YES SSH.

Visual Encoding Words

Sasha Natasha she wish shop cash rash sheets bashing shovel shut fish ship dish shed sheep shelf lash dash mash gash mesh shack flash shin sash shelter shoot short shot bishop

Story 33. Mr th and Mr TH

This is a story about two very naughty clowns called Mr th (as in the) and Mr TH (as in thin) The had a big argument about how to say their names because Mr th had a 'T' 'H' and Mr TH had a 'T' 'H'. "Now look here" said Mr TH "it must be TH because you're thin". "Take that!" said Mr th, squashing his friends nose, "and that is th". "Well, I'll tickle myself with a feather" said Mr TH, "you're quite right. When I say my name I stick my tongue right out and say TH and when you say your name, you only stick your tongue out a tiny bit and say th". "Don't stick your tongue out at me" said Mr th, "or I'll thump you in the teeth". "Think again my friend" Mr TH replied, "I'll thank you to keep your fingers and thumbs and that kind of thing to yourself and that's that". Then they both burst out laughing because they both realised that sometimes you say /th/ like the, this, that, then, and sometimes you /**th**/ like think, three, thump and thank you. But no matter how you say it, /th/ or /**th**/ it always looks like this, (write) th. So Mr th and Mr TH shook hands and thanked each other and with that they were best friends forever.

Visual Encoding Words

th - that the this then with them

th - thin thump teeth thank thing three with thrush thick moth cloth

Story 34. Quack Quack

Quentin went to the park today because he wanted to see if the duck eggs had hatched yet. The mother duck had been sitting on them in her nest for ages. When he got to the lakeside he could hardly believe his eyes, not only had the eggs hatched but all the quaint little baby ducks were swimming about with their mother and father. When they saw Quentin they flapped their wings and went "Qu qu" and tried to shoo him away from their babies. But Quentin knelt down beside the water and said, "qu qu - qu qu" back. "I'm not going to hurt your ducklings", he said, "I've brought you some food". He broke the bread into little pieces and he threw it into the water. All the ducklings stayed near their mother, making tiny qu qu qu noises. Whichever way she swam, they swam close behind her. HOW DID THE LITTLE DUCKLINGS SOUND? (QUIETLY) QU QU QU QU. While Quentin was busy feeding the ducks some naughty squirrels were quickly and quietly pinching the rest of the bread from Quentin's bag. "Quit doing that" Quentin said, "this bread is for the ducks". "Qu qu - qu qu" went the father duck, thanking Quentin, because he had a big family to feed now. Mother duck swam back to sit on her nest, she had had quite enough excitement for one day and all her baby ducklings snuggled round her. She looked like a queen on a throne, with father duck guarding them all and keeping them safe. "Qu Qu" he said as he swam backwards and forwards guarding his family. "Qu qu" went Quentin wishing them all goodbye. WHAT DID QUENTIN SAY TO MAKE FRIENDS WITH THE DUCKS? WHAT SOUND DOES QUENTIN'S NAME BEGIN WITH?

Visual Encoding Words

Quentin quaint quack quick quiet quit quest queen squash liquid queer quail quid quiz squid squib

Story 35. '<u>Ouch</u>'.

A long time ago Mrs Grout looked after a little girl called Mouse. Do you know why she was called Mouse? It was because when she was a tiny baby Mrs Grout found her on the ground outside her house, bound up in a shawl. She had lots of soft brown hair and she was making a loud squeaky sound and when Mrs Grout picked her up she said "Oh, you're so sweet, you look like a little mouse" and the name sort of stuck. Well, Mrs Grout became Mouse's Mum, and when Mouse was about 4 years old Mrs Grout taught her to sew. Mrs Grout was very good at sewing, she could even make a clown out of old bits of material. But guess what? When Mouse tried to sew she stuck a needle right into her thumb and made it bleed. "Ouch" she howled "I'm not doing any more stupid sewing, my finger is bleeding." WHAT WOULD YOU SAY IF YOU PRICKED YOUR FINGER? "There's no need to shout so loudly" Mrs Grout said, dabbing it with some cotton wool, "Everyone who learns to sew pricks their finger at least once". And she told her the story of Rapunzel, who pricked her finger on a spinning wheel and went to sleep for a hundred years. "At least we don't have any wicked witches to put spells on us nowadays" she laughed. Well, when Mouse grew up she became a famous dressmaker, making fabulous outfits for (current pop singer) and on the odd occasion when she pricks her finger and goes HOW DOES SHE GO? "Ouch", it always reminds her of her lovely old Mum who always called her Mouse. CAN YOU HEAR AN /OU/ SOUND IN MOUSE? (AND 'CLOWN' IN PICTURE). WHAT DO YOU THINK (CURRENT POP SINGER) WOULD SAY IF SHE PRICKED HER FINGER? WHAT DO YOU SAY WHEN YOU FALL OVER IN THE PLAYGROUND AND GRAZE YOUR KNEE? POINT TO THE LETTERS THAT SOUND LIKE 'OU'.

Story 36. Oi ...Ship ahoy!

Captain Troy and his crew, a man and a boy, were sailing their ship round the point with the lighthouse on, when all of a sudden the engine stopped. The engineer toiled for half and hour to fix it but it needed a new hose joint. "Look over there, Captain", said the boy, "we're drifting onto the rocks and the ship will smash up to pieces and we'll all drown". "Don't panic boy", Captain Troy replied, trying to stay calm, "I'll bet you a silver coin that we'll avoid those rocks and this is how we'll do it. We'll hoist a distress flag so that when the steamer comes past they will know we need help. We've got a long coil of rope and if we join it to their rope they will be able to tow us to safety. "He was just about to tell the boy to boil some water for a cup of tea when the steamer came into sight. "Oi, ship ahoy", they all shouted, "our engine had stopped". "Do you need some oil"? the men on steamer called back. "No thanks, we need a tow to the harbour, we have a coil of rope". The steamer came over and Captain Troy threw one end of the rope over to them and tied the other end of the rope onto the front of his ship so that the steamer could pull them along. "Oi ship ahoy, all set and ready to go" Captain Troy called over to steamer. "Oi ship ahoy, full steam ahead" the steamer Captain waved back as he towed the ship away from the rocks, safely back into the harbour. LETS PRACTISE CALLING A SHIP ACROSS THE SEA. OI SHIP AHOY.

Visual Encoding Words

Troy boy point toil joint hoist coin avoid coil join boil oil soil foil

Story 37. Mr Kue the Magician

Mr Kue the Magician was going to do a magic show for Sue's birthday barbecue party. Hugh and Matthew got there early and watched Mr Kue getting his show ready. "Now, **you** boy", Mr Kue said, "I'm going to make you disappear". "Who me", said Hugh. "Yes **you** Hugh" said Mr Kue, pointing his magic wand at Hugh. "Now I'll tell you what to do", said Mr Kue, opening his magic box. "When all the children come for my magic show, I'll ask you to get in my magic box. Then I'll wave my magic wand over the box and you will disappear. When I open the box, you'll be gone", he said. "But then I'll miss the barbecue" wailed Hugh. "Not at all, not at all", said Mr Kue, "when the right moment is due, I'll wave my magic wand again and rescue you". When all the other children arrived for the party, Mr Kue pointed his magic wand at Hugh and said GUESS WHAT? YES, 'YOU' "climb into the box. Mr Kue closed the lid. Then Mr Kue tapped the box with his wand and do you know, when he opened the lid, Hugh had disappeared. All the children looked inside and couldn't see Hugh at all. Mr Kue closed the lid again and waved his magic wand over it and when he opened it again, out jumped Hugh. "Have I missed the barbecue" he said, and everyone laughed. "No", they said "the first sausage is for .....YOU. WHOSE NAMES IN THE STORY HAVE THE SOUND /UE/.

Visual Encoding Words

Kue due cue fuel rescue barbecue hue duel

Story 38. Gingerbread Men

It was a horrible cold rainy day and the children couldn't go out to play. They kept hanging round their Auntie Gert, who was looking after them, saying "We haven't got anything to do". "I've got an idea", auntie Gert said, "let's make some gingerbread men, then we can eat them for tea when you mum comes home. So they put the water and ginger in a bowl with all the other ingredients. Ernie said, "Can I mix it up with a wooden spoon?" "Well, you could do," said Auntie Gert, "but it takes so much mixing you might get a blister on your finger. A better idea would be if I mix it all up with the electric mixer and you and your sister cut out the shapes with the gingerbread man cutter. So Auntie Gert plugged the mixer in and switched it on and it went er er er er and whizzed up the mixture into a big squidgy ball. When the children had rolled it out flat and cut out all the gingerbread men with the cutter, Auntie Gert put them on a tray and popped them in the oven to cook. While Ernie was waiting, he whizzed the wooden spoon round the bowl pretending he was a mixer, going er er er er HOW DOES THE MIXER GO? And when some left over gingerbread mixture got stuck on the spoon he licked it off.

Visual Encoding Words

Gert water mixer blister finger sister ever clever her jerk perk term cover herd

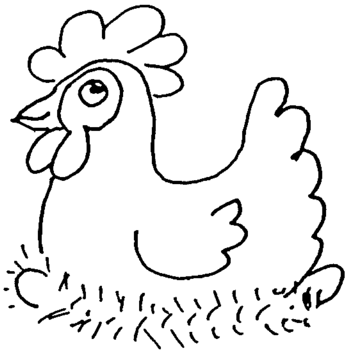
Story 39. Say 'ar'

Arlette woke up in the morning with a terrible sore throat. She cried because it hurt so much but crying made it hurt even more. Her mother took her to the doctor's wrapped up with a warm scarf round her neck. When they got to the doctors there were lots of people waiting. There was boy with a broken arm and girl with a cough but it wasn't long before it was Arlette's turn. When she went in the doctor said, " Now Arlette, I want you to open your mouth wide and say "Ar" so that I can look at you throat and see what's the matter". 'Arlette opened her mouth and said 'AR' and the doctor put a wooden spatula in her mouth to hold her tongue down. HAS THE DOCTOR EVER DONE THAT TO YOU? HOW DID YOU HAVE TO GO? "Ah huh," the doctor said, "Your tonsils are swollen and you will have to go to the hospital to have them out" HAVE ANY OF YOU HAD YOUR TONSILS OUT? LET'S LOOK IN THE BACK OF EACH OTHERS THROATS AND SEE IF WE CAN SEE THE TONSILS, THEY SOFT PINK BLOBS EACH SIDE OF YOUR THROAT. SAY 'AR'. Arlette was a bit scared but it didn't hurt a bit when they took her tonsils out because she had an injection to make her go to sleep. Afterwards, she had lots of ice cream and she never had a sore throat again.

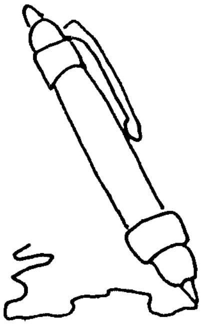
Visual Encoding Words

Warm scarf arm harm party march car park garden part cart bar dart marsh tart yard chart farm barm art harsh hard card jar larder charm dark

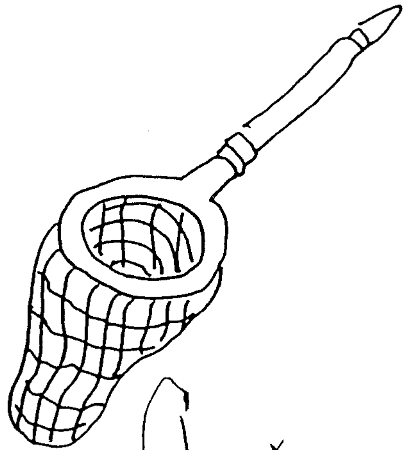
Appendix 4.



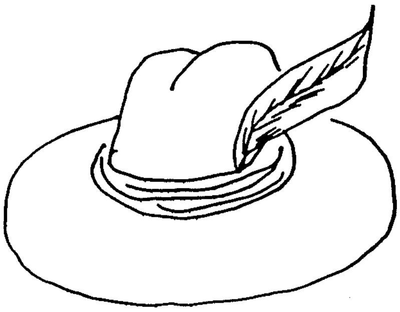
Hen



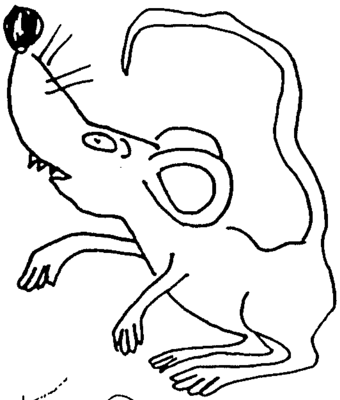
pen



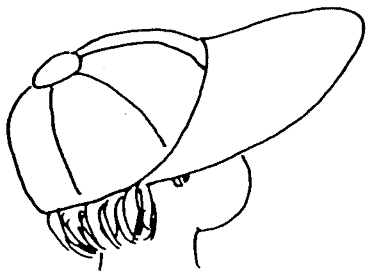
not



HAt

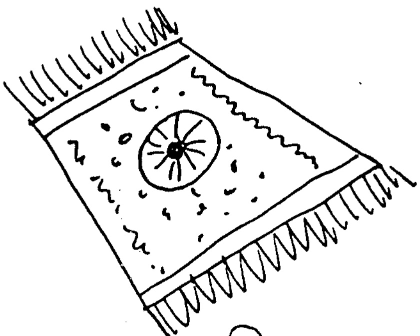


rAt



CAP

man



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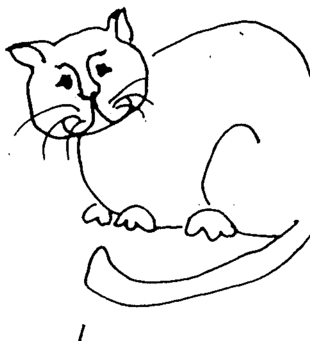

tAt

Baseline Repetition Errors For Words (T1)

Words I Syllable					Words 2 Syllables					Words 3 Syllables				
arm	moon	hat	brush	chair	rabbit	finger	button	sandwich	squirrel	motorbike	umbrella	ladybird	telephone	elephant
n/r	n/r	cat	brus x6	n/r	n/r	finker	apton	sanch	swi-	mopita	emella	laidbird	pehone	eleplant
		n/r	b'ush			jinger	butter	safige	firal	mokebike x3	umbella x3	n/r	telphone x3	ehant
			rush			n/r	putton	samwish	scibble	moatbike	ungrella		te'phone	e'iphant x2
			n/r				buttin x2	n/r	squirl	mokebite	umblella		n/r	elphant x2
							n/r		wirrel	mo'bike	'brella			ephant
									stirrel	n/r	n/r			ehant
									skirrel x4					n/r
									squirrer					
									swirrel					
									dirwal					
									skoorel					
									kirrel					
									kirsel					
									squirro					
									n/r					
Excluded as Errors			**excl.**	**excl.**	**excl.**	**excl.**	**excl.**	**excl.**	**excl.**	**excl.**	**excl.**	**excl.**	**excl.**	**excl.**
		ha' x2	jush	see'air	wabbit x3	thinger	bu'onx4	samwich x5	squill	mo'erbike x3	unjella		telehone	elephan'
		at x2	bus	dair	rabbi'		bo'in				umbella			elehant
					wabbi'									
End of Nursery Repetition Errors For Words (T2)									**T2**	**T2**	**T2**	**T2**	**T2**	**T2**
			b'ush					sham	fillol	mokerbike x3	n/r	laidbird		e'phant x2
			brus					sandwic'	coypeu					
								wicd	stiwel					
									swirrel					
									quirrel					
									sq'irrel					
									n/r					
Excluded as Errors			**excl.**	**excl.**	**excl.**	**excl.**	**excl.**	**excl.**	**excl.**	**excl.**	**excl.**	**excl.**	**excl.**	**excl.**
			brus	dair	wabbit x4		bu'on x3	samwich x9		mo'erbike x3			telehone	elehant
					rabbi' x2									

Appendix 5a

Baseline Repetition Errors For Non-Words (T1)

(Lexicalisations in bold)

Non Words I Syllable					Non Words 2 Syllables					Non Words 3 Syllables				
grall	nate	tull	mot	plurd	grindle	bannock	diller	rubid	pennet	kannifer	trumperine	brastering	parazon	dopelate
crawl x2	**matex2**	**towel x16**	**nut**	**perk**	grin**ball**	bannit	**dinnerx2**	rudbid	hennit	kaffer	trunderine	**blast**erin'	pedazon	doiatlate*
grant	**atex3**	**tail**	n/r x2	**word**	lindle	**banyard**	dia	n/r	hemet	kanfor	trumpine	**breast**eringx3	pazlar	**docolatex2 (chocolate)**
fork	nake	**tie**		plurtx2	gingle	ba-	di'erx2		n/r	kiffiner	trumlerine	**grasp**ering	karron	dopeleez
growl	n/r	**tellx2**		purdx4	gringlex2	bannot	n/r			kamfer	**tramperline**	vastering	parazay	w---
grawn		n/r		lurd	rindle	bannick				kafifer	trumperdrin	ratering	parion	**dog**elate
grol				clurd	grintle	bannack				tannifer	trumbeline	bestrin	aparzon	do'ilate
rall				n/r	n/r	n/r				kennifer	**trunk**erine	basting	pazanon	dofelate
frall										tallifer	tumperine	grasterin'	payandon*	n/r x3
drall										kanniser	trumpernine	bastering	karrazon	
gall										n/r x2	n/r x2	grastery*	parzon	
brall												n/r x2	parison	
n/r													pararon	
													n/rx3	
Excluded as Errors			**excl.**	**excl.**	**excl.**	**excl.**	**excl.**	**excl.**	**excl.**	**excl.**	**excl.**	**excl.**	**excl.**	**excl.**
	nai'	tou'x2			gindle				pennit	kanniher	tumpine		parahon	
	nai'	tol			grindaw'				pannet					
End of Nursery Repetition Errors For Non-Words (T2)										**T2**	**T2**	**T2**	**T2**	**T2**
ball	**neat**	**fail**	**not**	clurdx3	grinle	manock	**dinnerx2**		cannit	canter	tunkerine	slesling	pazon	dockidate
crawl		**towel x10**	**mopx2**	purd	gringle	bnot	dill		pellet	tanf	trumerline	brasting	paron	offerlate
graff		**hull**			grindol	bannotx7			tennit	tabilar	trumperline	brasring	panazon	dofitate
glall					rindlex2	bannick			n/r	kanfer	trumpine	bratering	parraz	**tabilat (tablet)**
brall					n/r				bennet	tamfer	trupte	grasteringx3	parazo'	dotilate
									kennet	taniferx2	n/rx3	bra'tering	powzon	n/rx2
										tanifor		n/rx4		dopolate
										n/rx2				**docerlate (chocolate)**
Excluded as Errors			**excl.**	**excl.**	**excl.**	**excl.**	**excl.**	**excl.**	**excl.**	**excl.**	**excl.**	**excl.**	**excl.**	**excl.**
									penne'	haniher			pallazon	dohilate

Appendix 5b

Appendix 6.

Blending task. (Recorded presentation) **24 items**

"Now you see these three pictures, jam-jug-peg. well, I'm going to sound out the letters of one of the words and I want you to show me which one it is".

Practise item: **"Point to the picture that shows j-ug". "Now which picture shows b-oa-t?"**

Continue each set: **"Point to the picture that shows ....." "And which picture shows....."**

Circle chosen word.

jam	*j-ug*	*peg*	*onset-rime*	***Practise items.***	
bag	*gate*	*b-oa-t*	*phoneme*	***Practice items.***	
mop	**m-an**	bun	o/r		<-name target item at end
t-i-n	men	tap	ph		of test, if not chosen.
zip	**c-u-p**	cat	ph		
leaf	bag	**l-eg**	o/r		
s-o-ck	sun	kick	ph		
kiss	bath	**b-us**	o/r		
pig	**d-og**	duck	o/r		
h-a-t	cot	hen	ph		
fan	pot	**p-e-n**	ph		
chop	**ch-ick**	sack	o/r		
n-ai-l	knot	hill	ph		
c-oi-n	kite	moon	ph		
r-ing	bang	rain	o/r		
fly	**s-k-y**	star	ph		
soap	box	**s-ix**	o/r		
pop	shell	**sh-op**	o/r		
puppy	**j-e-ll-y**	jump	ph		
sh-ar-k	cake	ship	ph		
fish	nut	**f-oot**	o/r		
mat	**m-ug**	pig	o/r		
cloud	smack	**cl-oak**	o/r		**Score**
plate	train	**t-oa-s-t**	ph		**o/r**
fl-oat	flag	tent	o/r		**ph**
pram	**p-l-u-g**	frog	ph		**total**

If child fails to chose correctly, test vocabulary by asking for the name of target item at the end.